INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE

MÉMOIRES

DEUXIÈME SÉRIE, FASC. 86

KONINKLIJK BELGISCH INSTITUUT VOOR NATUURWETENSCHAPPEN

VERHANDELINGEN

TWEEDE REEKS, DEEL 86

AMAZONIAN ALGAE

BY

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VÄXTBIOLOGISKA INSTITUTIONEN, UPPSALA.

BRUXELLES

INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE

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VAUTIERSTRAAT 31

1971

Uitgedeeld de 31e juli 1971.

PLATE I

EXPLANATION OF PLATE I.

1. *Phacus platalea* v. *maior* DE POUCQUES, Maica.
2. *Trachelomonas armata* v. *longispina* PLAYF. em. DEFL., Maica.
3. *T. zingeri* ROLL forma, Maica.
4. *Tetraëdriella regularis* (KÜTZ.) FOTT, Maica.
5. *Actinotaenium turgidum* v. *ligatum* (W. and W.) TEILING, Maica.
6. *Euastrum brasiliense* v. *convergens* KRIEGER, Eva.
7. *E. ornans* FÖRSTER, Eva.
8. *Xanthidium trilobum* NORDST., Maica.
9. *Staurodesmus clepsydra* f. *obtusa* (NORDST.) TEILING, Maica.

10-11. *S. spencerianus* (MASK.) TEILING, Maica.

12. *S. megacanthus* v. *triangularis* (GRÖNBL.) TEILING forma, Maica.
13. *S. pseudoarthrodesmus* (GRÖNBL.) TEILING, Maica.

14-15. *Staurastrum boergesenii* v. *depauperatum* GRÖNBL., Maica.

16. *S. penicilliferum* GRÖNBL., Maica.
17. *S. boergesenii* v. *simplicior* RACIB., Maica.

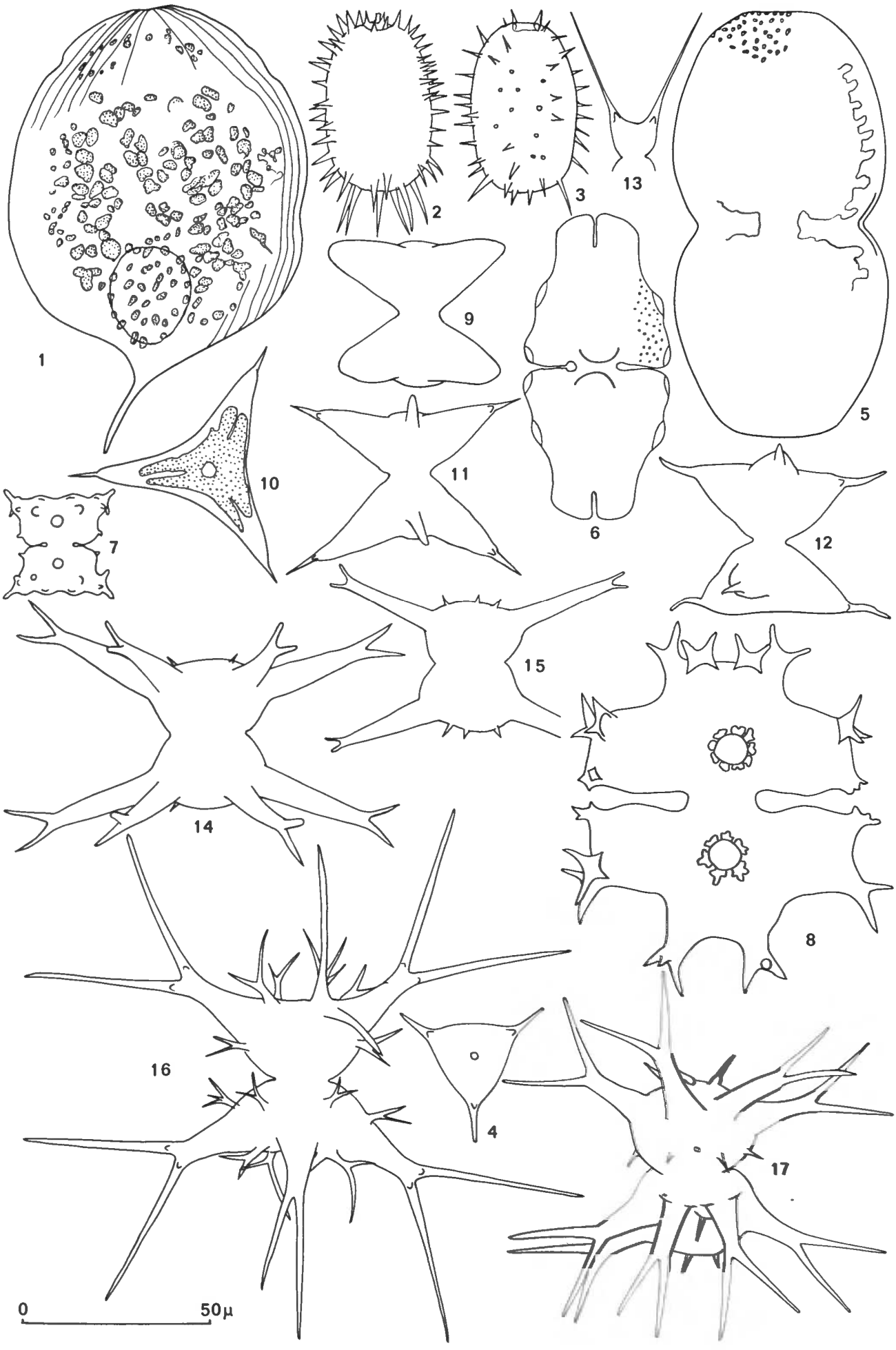

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PLATE II

EXPLANATION OF PLATE II.

1-3. *Xanthidium mamillosum* (GRÖNBL.) FÖRSTER, Eva.

4. *X. pseudoregulare* v. *hexagonum* THOM., Jurucui.

5. *X. fragile* BORGE, Jurucui.

6-7. *Arthrodesmus longispinus* BORGE, Maica.

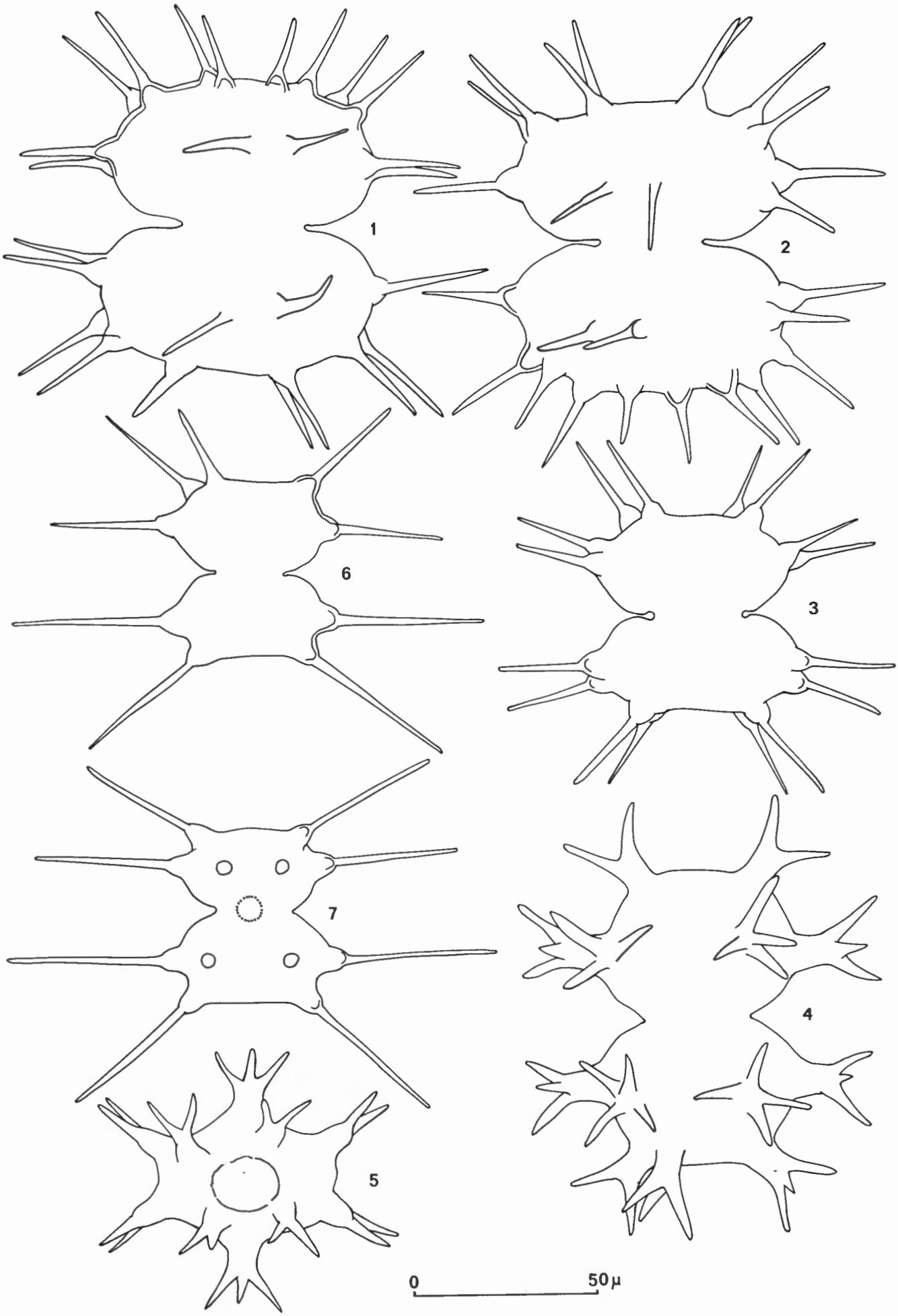

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PLATE III

EXPLANATION OF PLATE III.

1-3. *Staurastrum vestitum* v. *subanatinum* W. and W., Maica.

4. *S. leptocladum* v. *africanum* G. S. WEST forma, Maica.

5. *S. glabribrachiatum* FÖRSTER, Maica.

6. *S. subanchora* GRÖNBL. forma, Maica.

7. *S. sebaldi* v. *ornatum* NORDST., Maica.

8-10. *S. pseudoquadrangulare* THOM., Eva.

11. *S. quadrinotatum* GRÖNBL. forma, Eva.

12. *S. tectum* v. *ayayense* GRÖNBL, Maica.

13. *S. octodontum* v. *longibrachiatum* THOM., Eva.

14. *S. columbetoides* v. *ginzbergeri* (GRÖNBL.) SCOTT, Maica.

15. *S. siolii* f. *divergens* THOM., Maica.

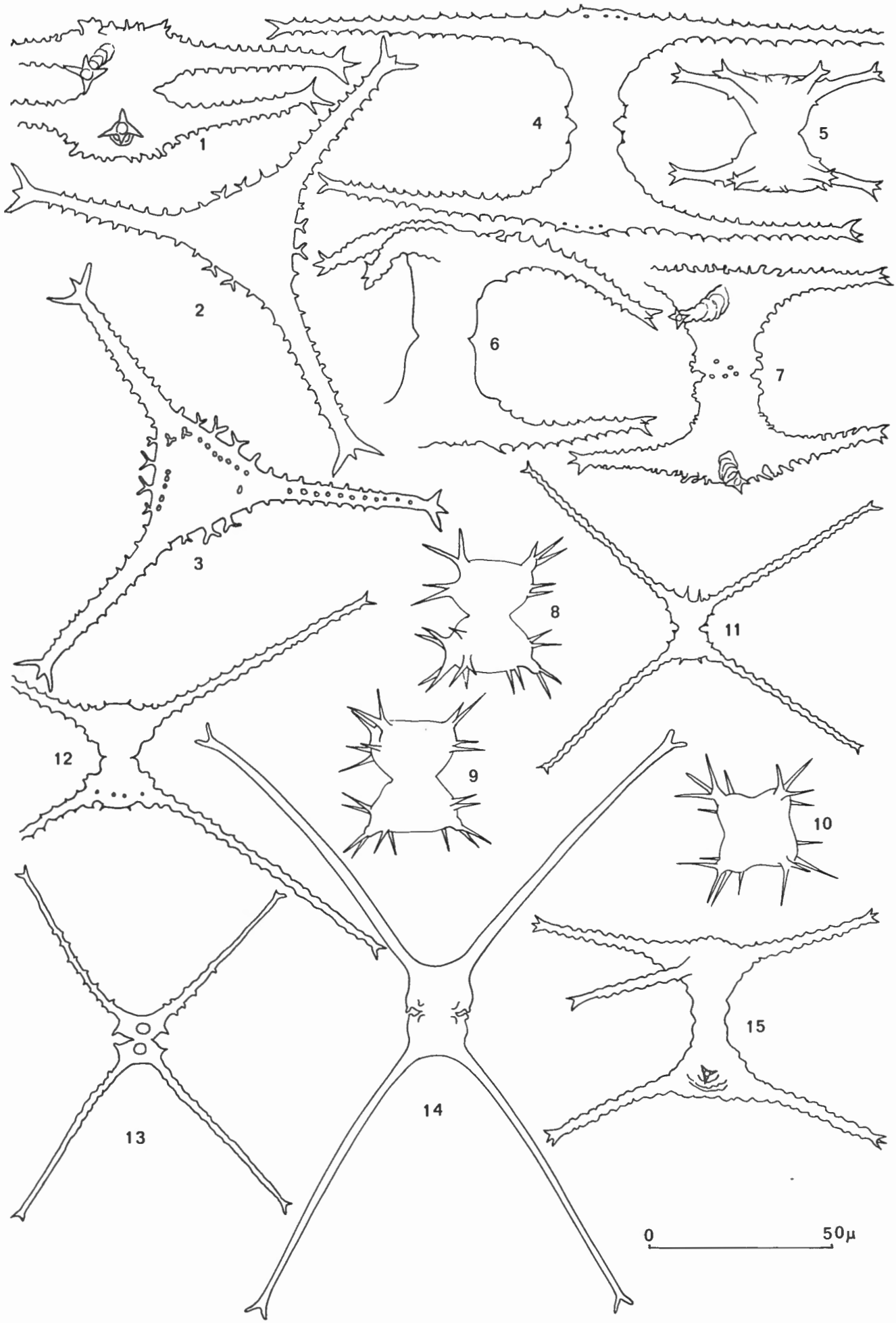

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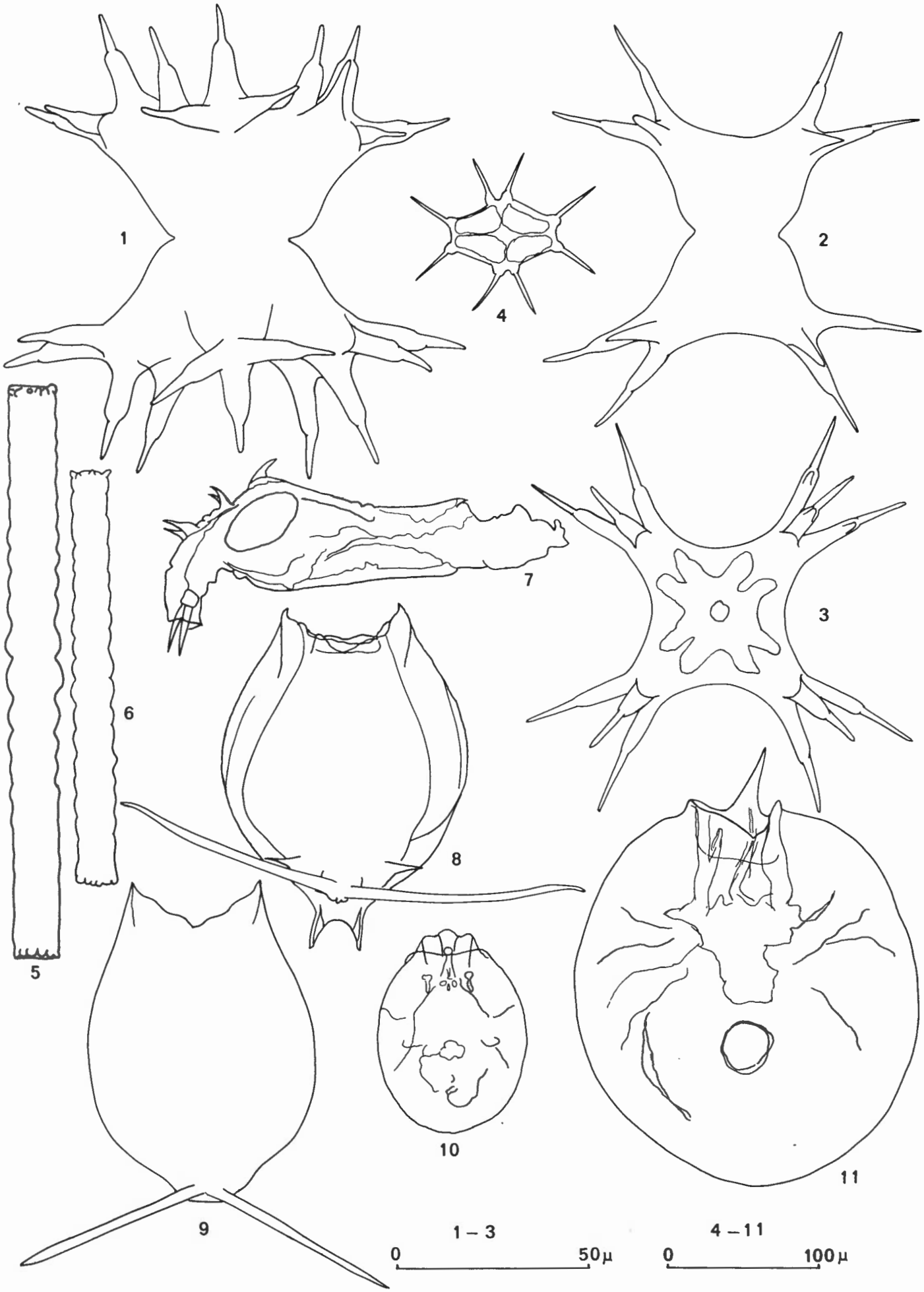
PLATE IV

EXPLANATION OF PLATE IV.

1. *Staurastrum brasiliense* v. *porrectum* BORGE, Maica.
2-3. *S. brasiliense* NORDST., Maica.
4. *Xanthidium mamillosum* (GRÖNBL.) FÖRSTER, Eva.
5-6. *Pleurotaenium coronatum* v. *fluctuatum* W. WEST, Eva.
7. *Dissotrocha aculeata medioaculeata* (JANSON), Maica.
8. *Lecane leontina* (TURNER), Maica.
9. *L. curvicornis* (MURRAY) ?, Maica.
10. *Testudinella ahlstromi* HAUER, Maica.
11. *T. haueriensis* GILLARD, Maica.



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SMITHSONIAN INSTITUTION

PLATE V

EXPLANATION OF PLATE V.

1. *Micrasterias radiata* v. *gracillima* G. M. SMITH, Maica.
2. *Lecane proiecta* HAUER, Maica.
3. *Pleurotaenium coronatum* v. *fluctuatum* W. WEST, Eva.
4. *Chrysopyxis iwanoffii* LAUTERB., Jurucui.
5. *Gonyaulax digitale* (POUCHET) KOFOID, Eva.
6. *Glenodinium pernardiforme* (LINDEM.) SCHILLER ?, Eva.

7-8. *Staurastrum jurucuiense* THOM., Maica.

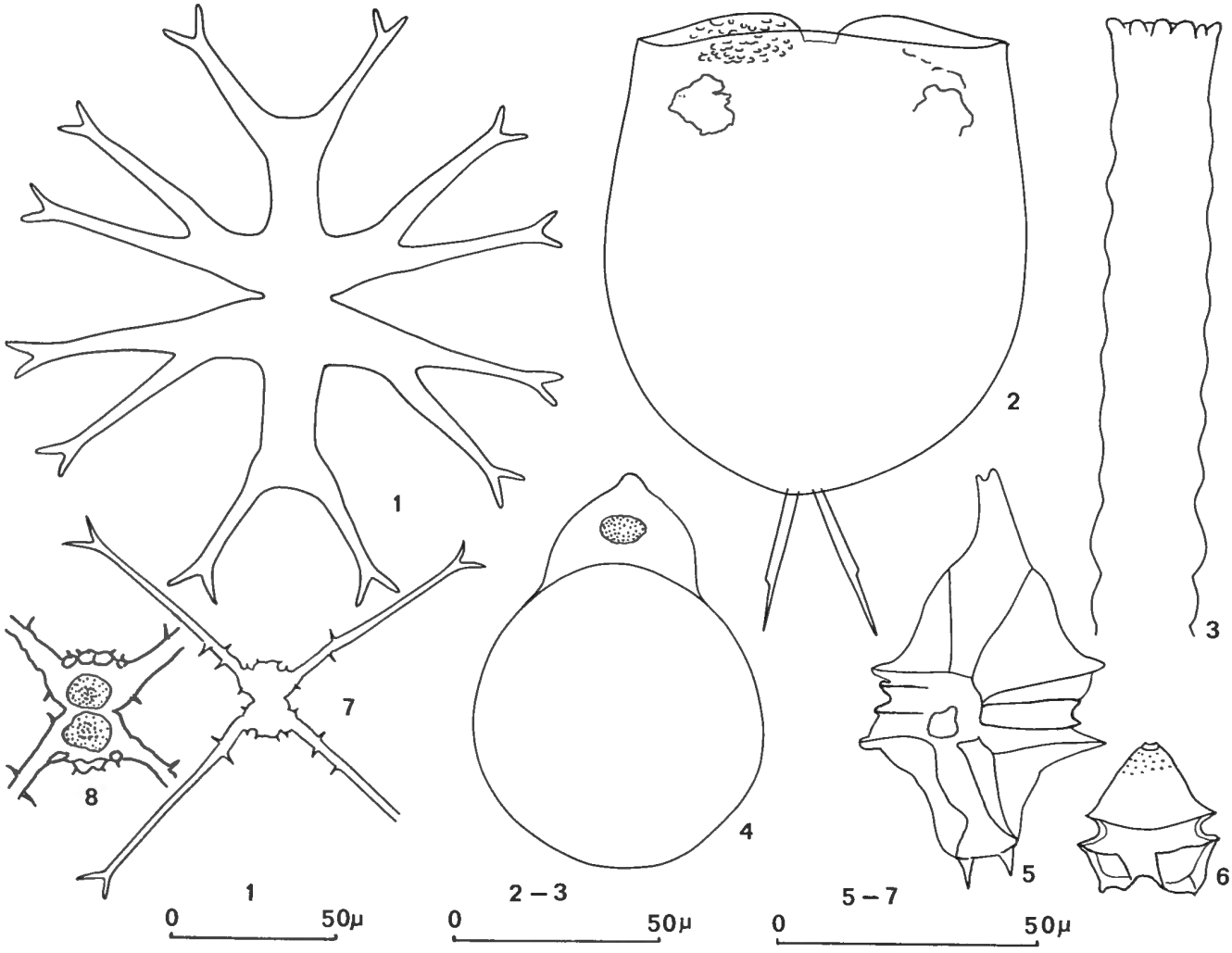

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PLATE VI

EXPLANATION OF PLATE VI.

1. *Penium spirostriolatum* f. *elongatum* THOM., Jurucui.
2. *Surirella arcta* A. SMITH, Jurucui.
3. *Closterium baillyanum* f. *curvatum* THOM., Jurucui.
4-5. *C. turgidum* v. *borgei* DEFL., Jurucui.
6. *C. lunula* (MÜLL.) NITZSCH., Jurucui.
7. *C. lunula* (MÜLL.) NITZSCH. forma, Jurucui.
8. *C. lunula* (MÜLL.) NITZSCH., Jurucui.
9. *C. costatum* CORDA, Jurucui.
10. *Xanthidium fragile* BORGE, Jurucui.
11. *Staurastrum octodontum* v. *longibrachiatum* THOM., Jurucui
12. *Micrasterias rotata* (GREV.) RALFS, Jurucui.
13-15. *Phacus platalea* v. *maior* DE POUCQUES, Maica.
16. *Phacus longicauda* (EHRENB.) DUJ., Maica.
17. *Euglena tripteris* (DUJ.) KLEBS, Maica.

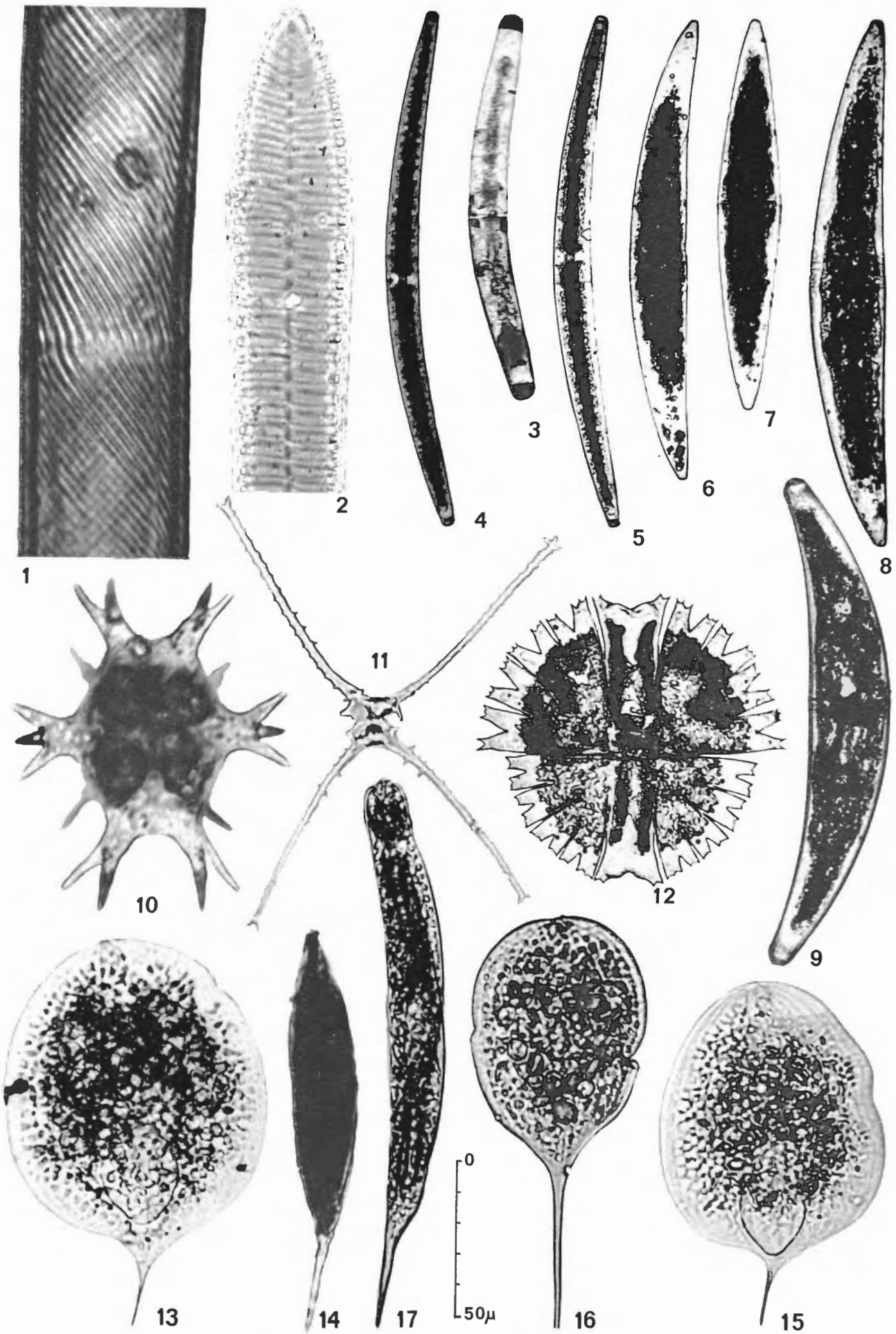

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PLATE VII

EXPLANATION OF PLATE VII.

1. *Penium spirostriolatum* f. *elongatum* THOM., Jurucui.
2. *Closterium macilentum* BRÉB. forma, Jurucui.
3. *C. lunula* (MÜLL.) NITZSCH., Jurucui.
4. *Pleurotaenium minutum* v. *latum* KAISER forma, Jurucui.
5. *P. elatum* v. *alternans* (NORDST.) GRÖNBL., Maica.
6. *Surirella arcta* A. SMITH, Jurucui.

7-9. *Micrasterias rotata* (GREV.) RALFS, Jurucui.

10-11. *M. borgei* v. *quadriverrucosa* THOM., Jurucui.

12. *M. borgei* KRIEGER, Maica.

13-15. *Pleurotaenium coronatum* v. *fluctuatum* W. WEST, Jurucui.

16-17. *Gonyaulax digitale* (POUCHET) KOFOID, Eva.

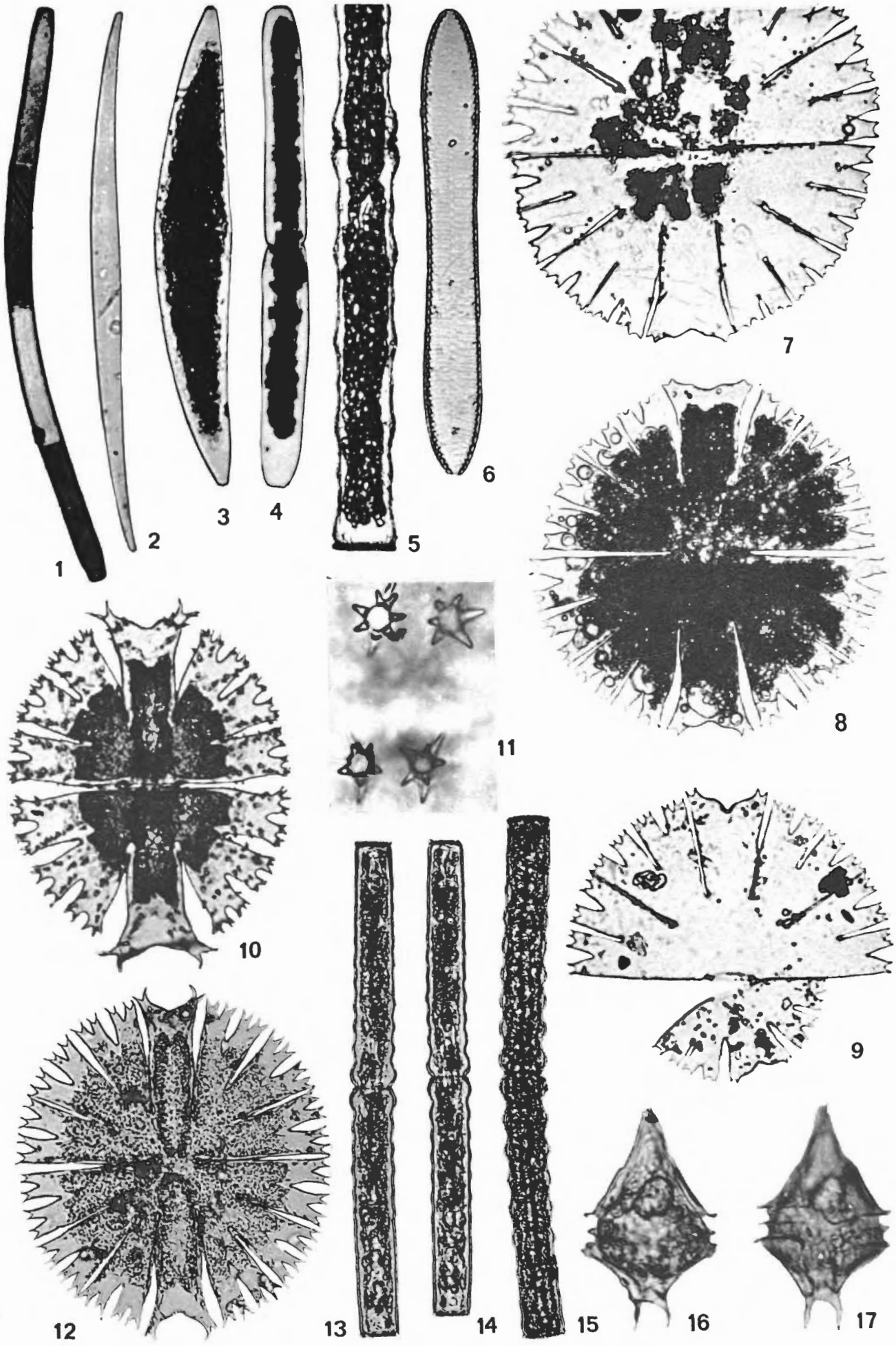

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PLATE VIII

EXPLANATION OF PLATE VIII.

1-3. *Staurastrum subanchora* GRÖNBL., Maica.

4. *S. brasiliense* v. *porrectum* BORGE.

5. *Penium spirostriolatum* f. *elongatum* THOM., Jurucui.

6. *Closterium turgidum* v. *borgei* DEFL., Jurucui.

7-9. *C. costatum* CORDA, Jurucui.

10-11. *C. porrectum* v. *borgei* (BORGE) FÖRSTER, Jurucui.

12. *Oedogonium spirale* HIRN, Jurucui.

13. *Oedogonium* sp., Jurucui.

14-15. *Bulbochaete imperialis* WITTR., Jurucui.

16. Zygospore of *Closterium navicula* (BRÉB.) LÜTKEM. or *Cylindrocystis*, Jurucui.

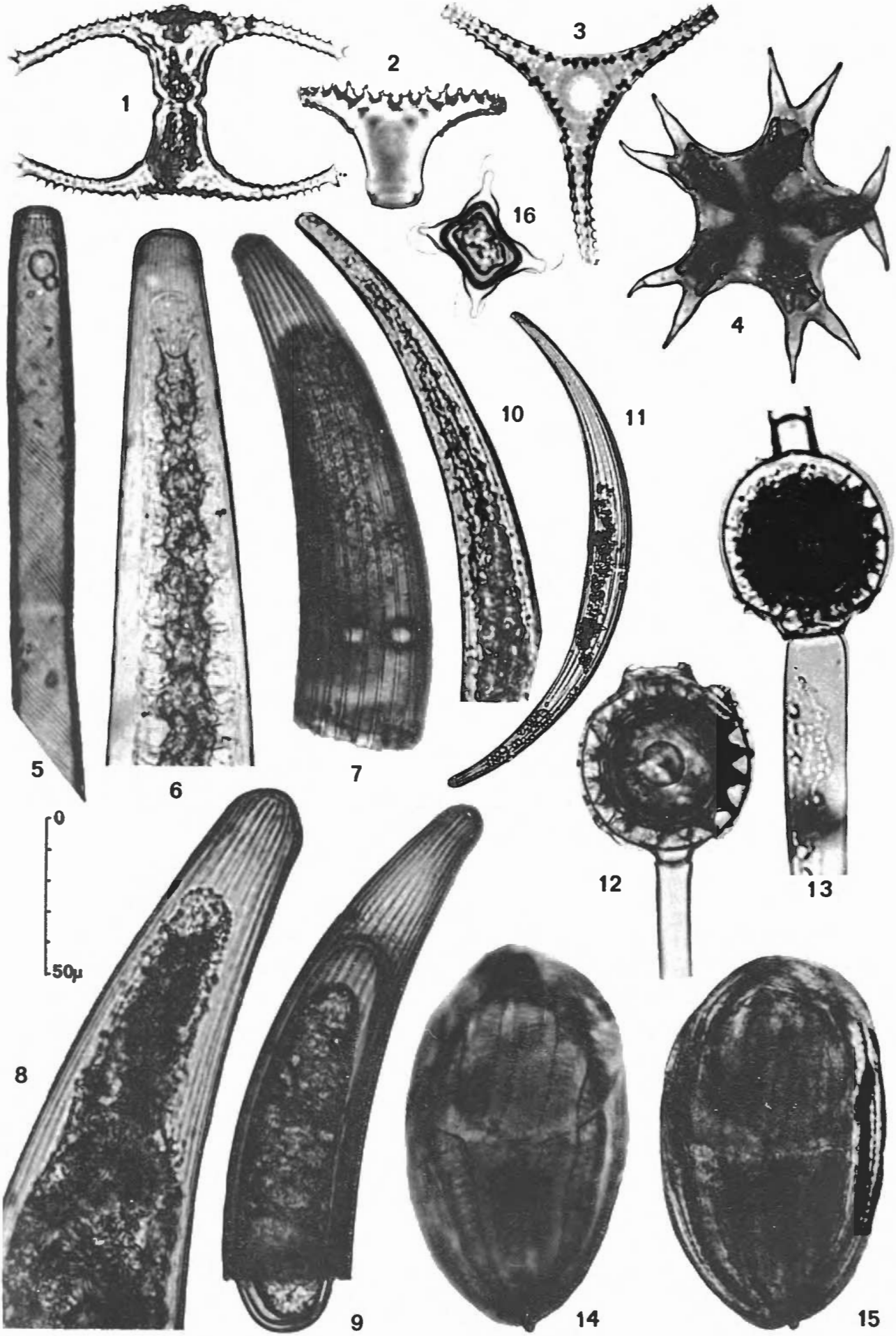

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PLATE IX

EXPLANATION OF PLATE IX.

1-2. *Cosmarium denticulatum* v. *rotundatum* f. *mediolaeve* FÖRSTER, Jurucui.

3. *C. denticulatum* v. *perspinosum* GRÖNBL., Jurucui.

4-7. *C. pseudopachydermum* NORDST. forma, Jurucui.

8. *C. nitidulum* DE NOT., Jurucui.

9. *C. connatum* BRÉB., Jurucui.

10-11. *C. lagoense* v. *cornigerum* NORDST., Maica.

12. *C. radimitum* BORGE.

13-14. *Cosmarium* sp., Eva.

15. *Centritractus belonophorus* LEMM., Maica.

16. *Derepyxis ollula* v. *ovata* (WISL.) MATV., Jurucui.

17. *Actinella brasiliense* GRUN., Jurucui.

18. *A. guianensis* GRUN., Eva.

19. *Eunotia zygodon* EHRENB., Maica.

20. *E. subrobusta* HUST., Jurucui.

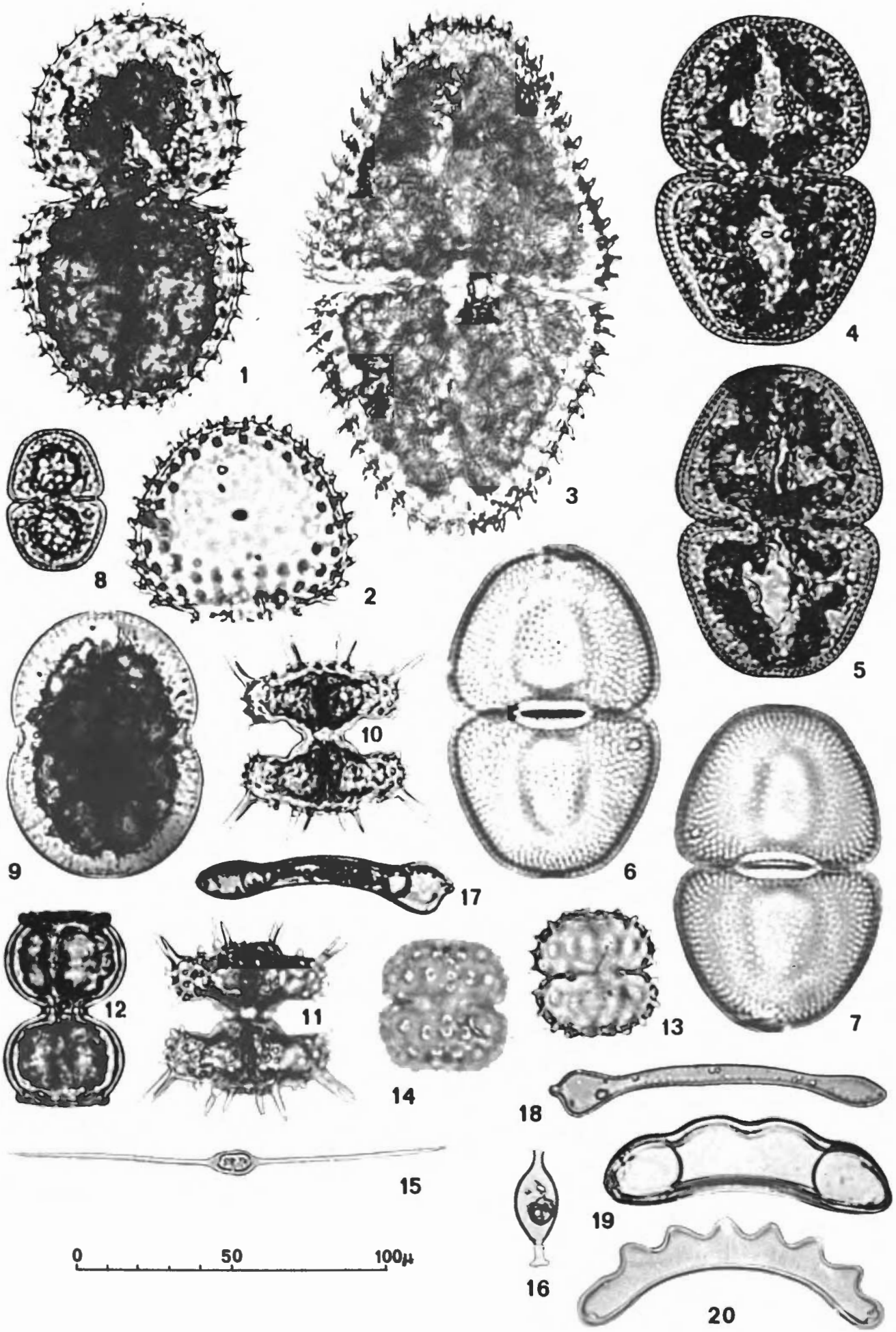

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PLATE X

EXPLANATION OF PLATE X.

1-3. *Cosmarium groenbladii* THOM., Jurucui.

4-5. *Staurastrum penicilliferum* GRÖNBL., Jurucui.

6. *Actinella mirabilis* GRUN., Jurucui.

7. *Pleurotaenium verrucosum* (BAIL.) LUND., Jurucui.

8. *P. coronatum* v. *fluctuatum* W. WEST, Jurucui.

9. *Treubaria varia* TIFFANY and AHLSTROM, Maica.

10. *Cosmarium groenbladii* f. *rotundata* THOM., Jurucui.

11. *Staurastrum jurucuiense* THOM., Jurucui.

12-13. *Rhizosolenia braunii* HUST. forma, Jurucui.

14. *Staurodesmus spencerianus* v. *cruciatus* (KRIEGER) TEILING forma, Jurucui.

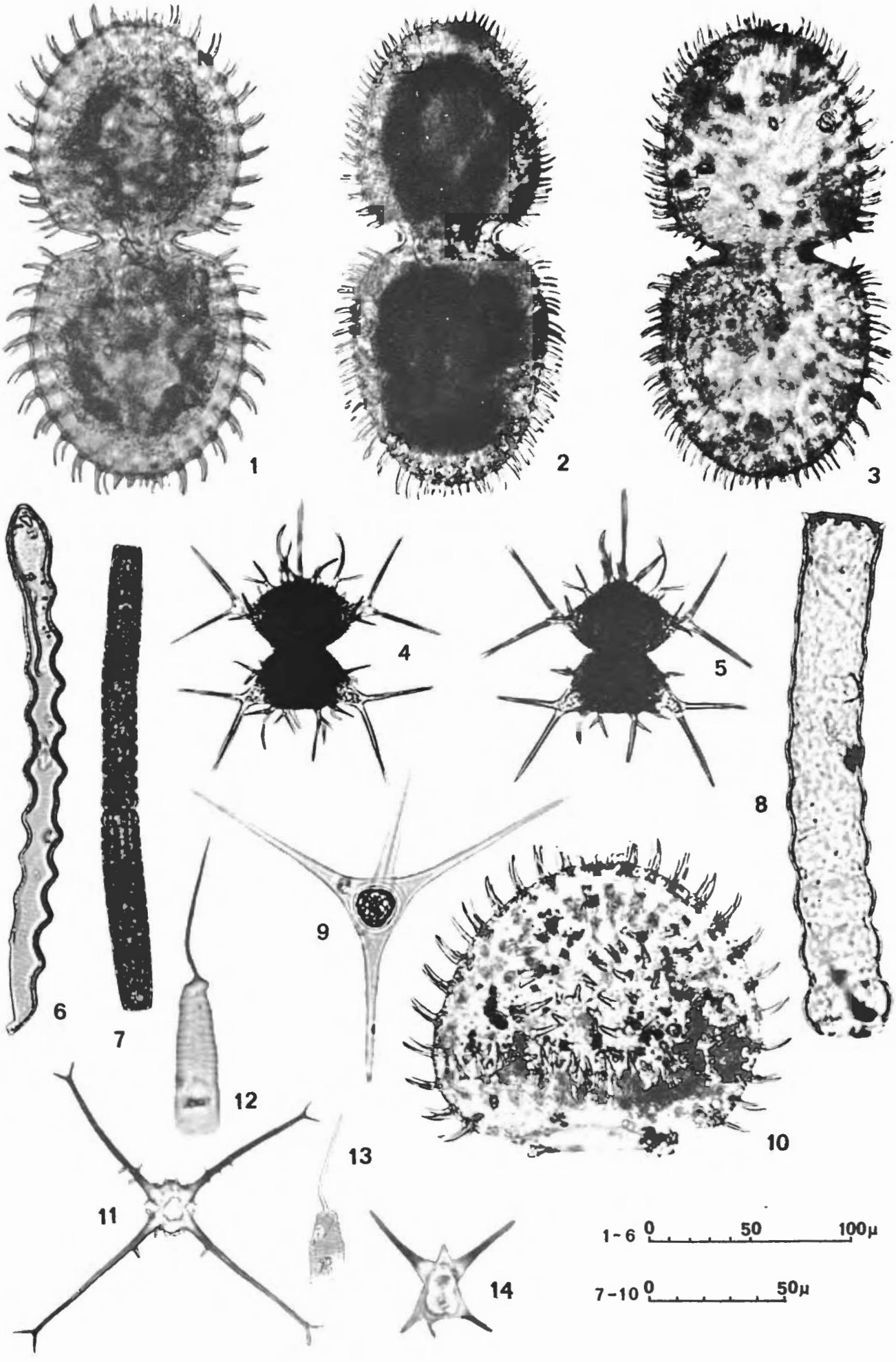

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PLATE XI

EXPLANATION OF PLATE XI.

1. *Actinotaenium tumidum* v. *brasiliense* (GRÖNBL.) TEILING, Eva.
2. *Euastrum obliqueporum* BRANDHAM, Jurucui.
3. *E. evolutum* v. *perornatum* SCOTT and CROASDALE, Jurucui.
4. *Micrasterias arcuata* BAIL., Jurucui.
5. *Xanthidium paraguayense* BORGE, Maica.
6. *Cosmarium contractum* KIRCHN., Jurucui.
7. *Euastrum ornans* FÖRSTER, Eva.

8-11. *Cosmarium ornatum* v. *pseudolagoense* FÖRSTER, Jurucui.

12. *C. bitriangulum* GRÖNBL., Maica.
13. *C. pseudotaxichondrum* v. *longii* (TAYLOR) SCOTT forma, Jurucui.
14. *Teilingia wallichii* (JACOBS.) BOURRELLY, Jurucui.

15-16. *Desmidium curvatum* NORDST., Jurucui.

17. *Desmidium elegans* (RACIB.) GRÖNBL. forma, zygot, Jurucui.
18. *Trachelomonas spinosa* STOCKES, Jurucui.
19. *T. sydneyensis* v. *obesa* f. *longispina* THOM., Maica.
20. *T. zingeri* ROLL forma, Maica.
21. *T. sydneyensis* PLAYF., Maica.
22. *Phacus swirenkoi* SKWORZ. ?, Maica.
23. *Scenedesmus quadricauda* v. *quadrispina* (CHOD.) G. M. SMITH, Jurucui.
24. *Eunotia subrobusta* HUST., Jurucui.

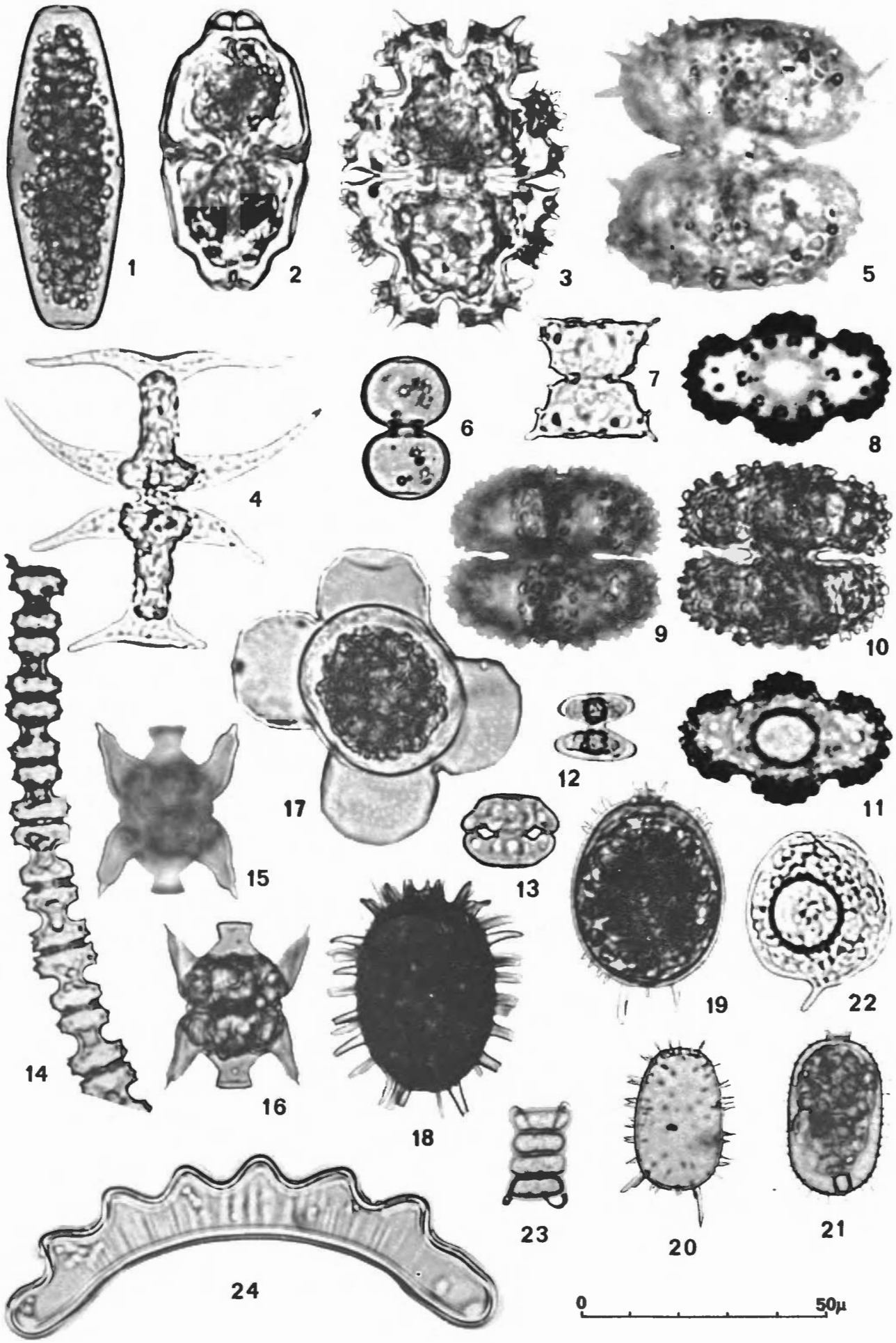

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PLATE XII

EXPLANATION OF PLATE XII.

1. *Micrasterias truncata* f. *gibbosa* THOM., Jurucui.

2-3. *M. arcuata* BAIL., Jurucui.

4. *M. borgei* v. *quadriverrucosa* THOM., Jurucui.

5-8. *Euastrum brasiliense* v. *convergens* KRIEGER, Maica, Jurucui.

9. *E. evolutum* v. *monticulosum* (TAYLOR) KRIEGER forma, Eva.

10-11. *E. evolutum* v. *perornatum* SCOTT and CROASD., Jurucui.

12-13. *Xanthidium paraguayense* BORGE, Maica.

14. *Phymatodocis nordstedtiana* f. *minor* BØRGES., Jurucui.

15. *Desmidium pseudostreptonema* W. and W., Jurucui.

16. *D. cylindricum* v. *obliquum* W. and W., Jurucui.

17. *D. elegans* (RACIB.) GRÖNBL. forma, Jurucui.

18-19. *Sphaerozosma laeve* (NORDST.) THOM. forma, Maica.

20. *Micrasterias rotata* (GREV.) RALFS, Jurucui.

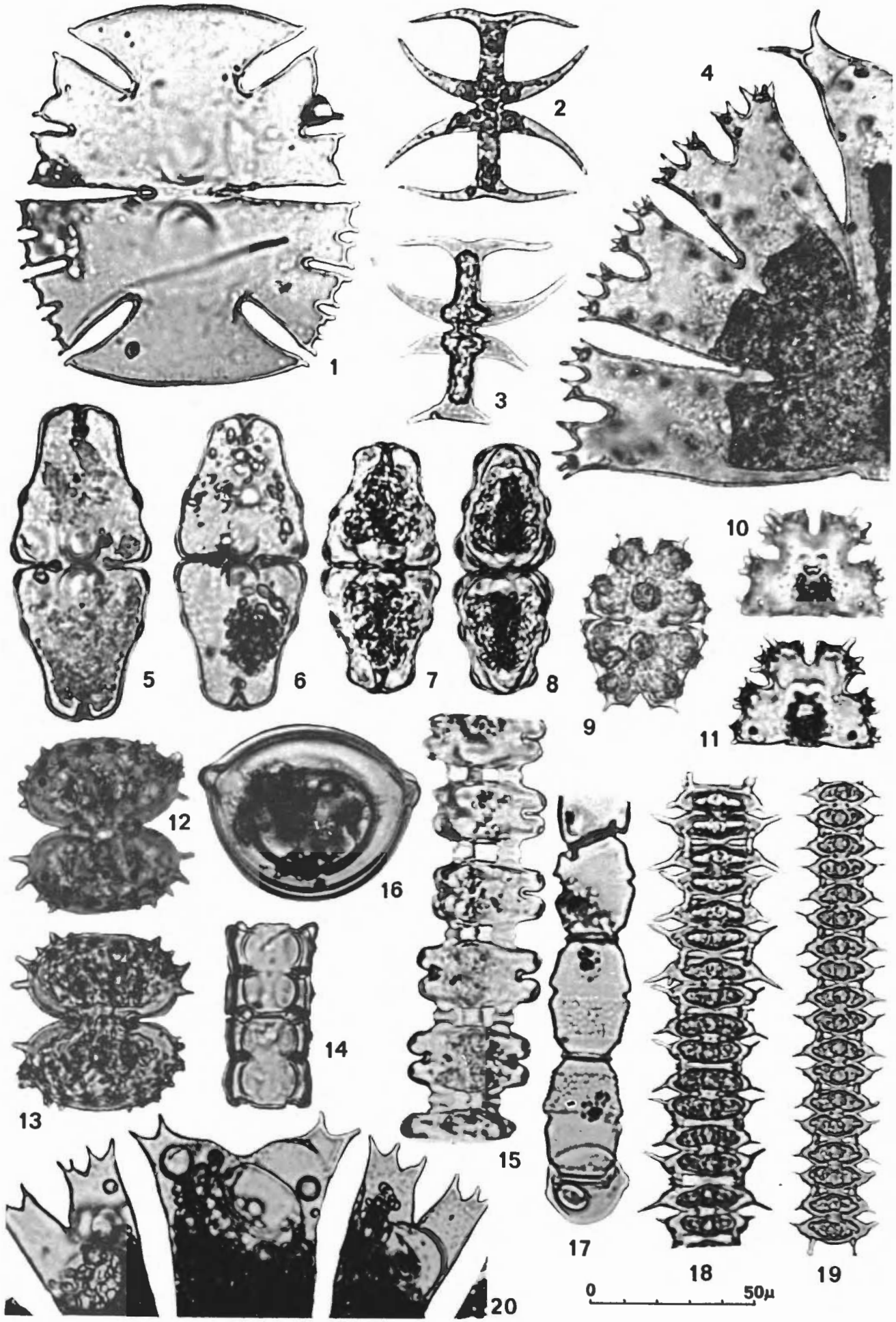

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PLATE XIII

EXPLANATION OF PLATE XIII.

1-3. *Micrasterias truncata* f. *gibbosa* THOM., Jurucui.

4. *M. radiata* v. *groenbladii* CROASD., Jurucui.

5. *M. mahabuleshwarensis* v. *ampullacea* (MASK.) NORDST., Jurucui.

6. *Pleodorina illinoisensis* KOFOID, Maica.

7-8. *Xanthidium canadense* v. *amazonense* FÖRSTER, Jurucui.

9. *Staurastrum brasiliense* NORDST., Jurucui.

10. *S. boergesenii* RACIB., Jurucui.

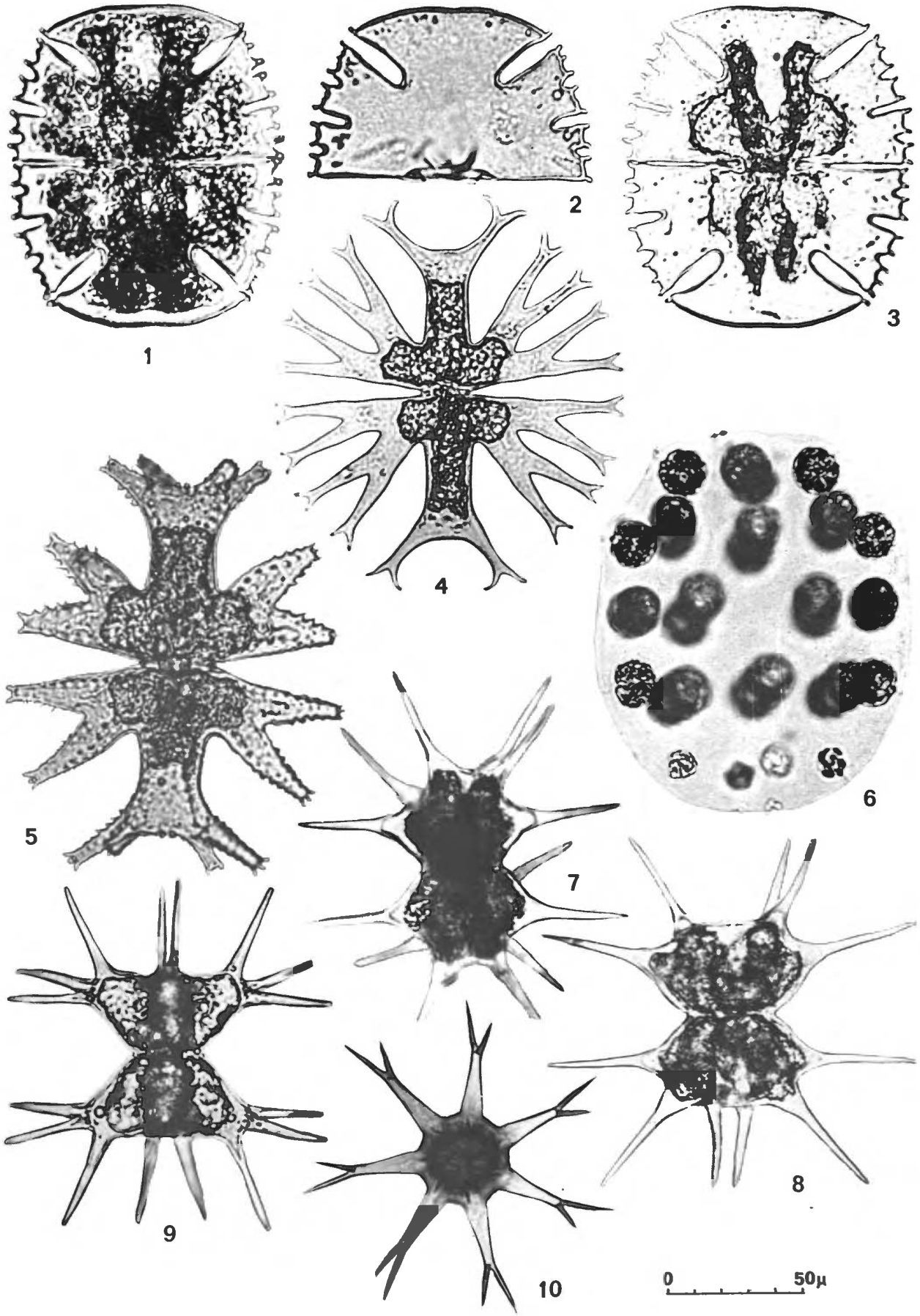

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PLATE XIV

EXPLANATION OF PLATE XIV.

1. *Triploceras gracile* v. *bidentatum* NORDST., Jurucui.
2-3. *Micrasterias radiata* f. *gracillima* G. M. SMITH, Maica, Jurucui.
4. *M. radiata* v. *groenbladii* CROASD., Maica.
5. *M. borgei* f. *minor* THOM., Maica.
6-8. *M. alata* f. *gracilior* GRÖNBL., Jurucui.
9. *Staurastrum brasiliense* NORDST., Jurucui.
10. *Xanthidium canadense* v. *amazonense* FÖRSTER, Jurucui.
11. *Closterium costatum* CORDA, Jurucui.
12. *C. macilentum* BRÉB., Jurucui.
13. *Actinella* growing on branched hyaline mucilage-stalk, Jurucui.

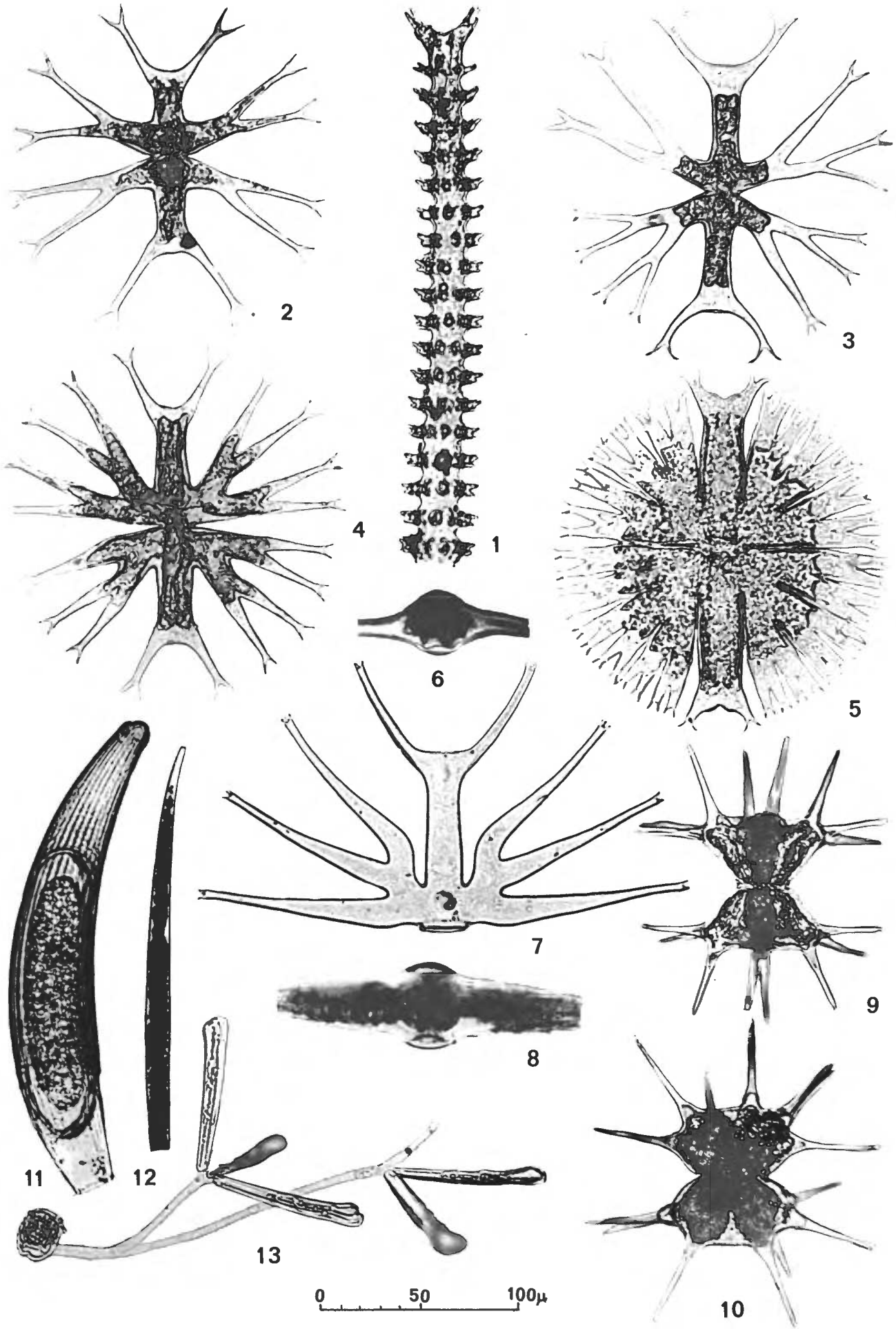

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PLATE XV

EXPLANATION OF PLATE XV.

1-6. *Xanthidium fragile* BORGE, Jurucui.

7-14. *X. pseudoregulare* v. *hexagonum* THOM., Jurucui.

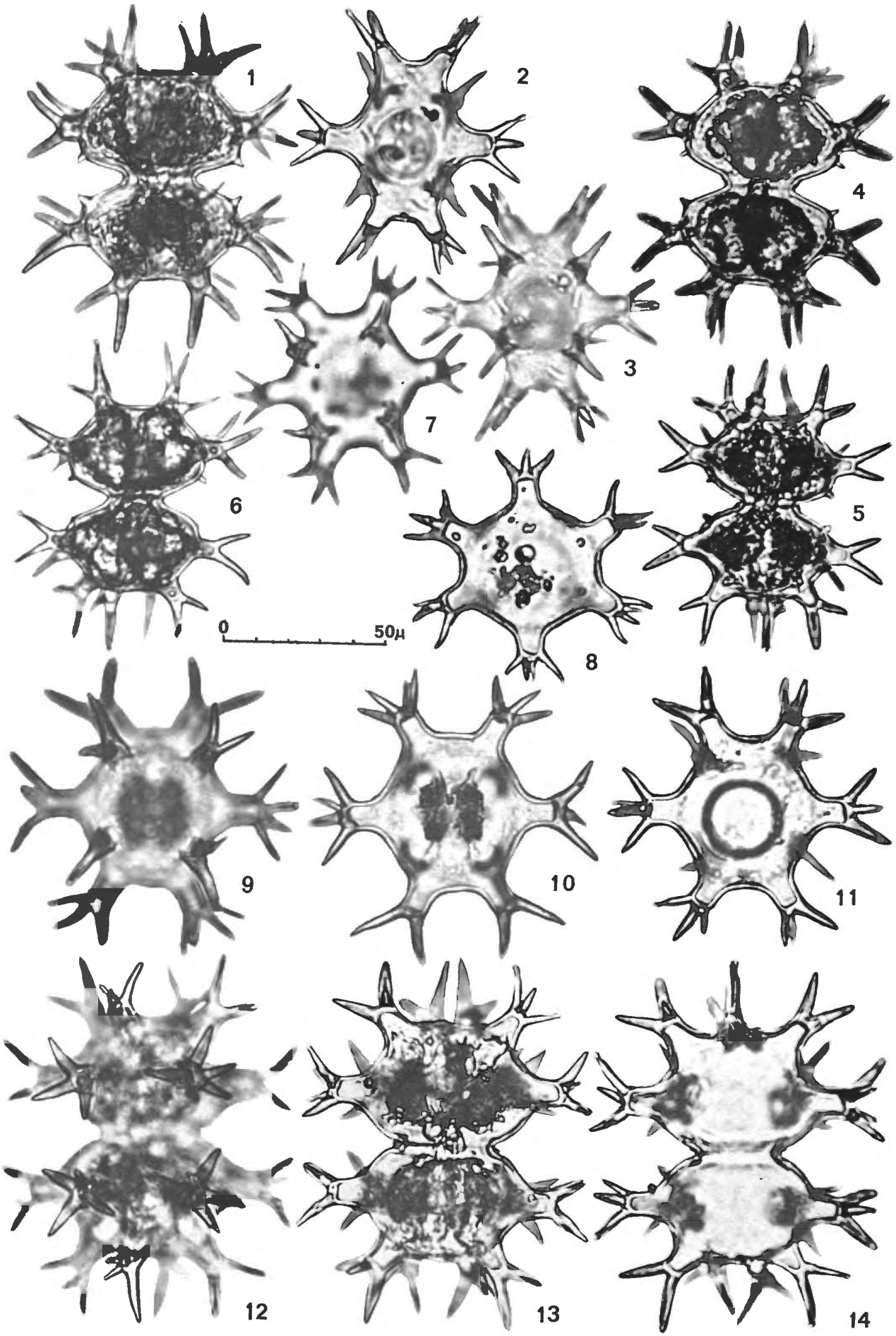

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PLATE XVI

EXPLANATION OF PLATE XVI.

1-4. *Staurodesmus validus* (W. and W.) THOM., Jurucui.

5. *S. subulatus* f. *nordstedtii* (G. M. SMITH) THOM., Jurucui.

6-7. *S. triangularis* v. *limneticus* TEILING, Jurucui.

8. *S. quiriferus* v. *evolutus* (FRITSCH and RICH) TEILING, Eva.

9. *S. spencerianus* (MASK.) TEILING, Maica.

10. *S. megacanthus* v. *triangularis* (GRÖNBL.) TEILING forma, Maica.

11-12. *Xanthidium nordstedtii* (GRÖNBL.) THOM., Jurucui.

13. *X. mamillosum* (GRÖNBL.) FÖRSTER, Maica.

14-15. *X. trilobum* NORDST., Jurucui, Maica.

16. *Scenedesmus ecornis* f. *granulatus* THOM., Jurucui.

17. *Sorastrum americanum* (BOHLIN) SCHMIDLE, Jurucui.

18. *Coelastrum cambricum* ARCHER, Jurucui.

19. Spore of *Tetraploa aristata* BARK. and BR., an imperfect fungus.

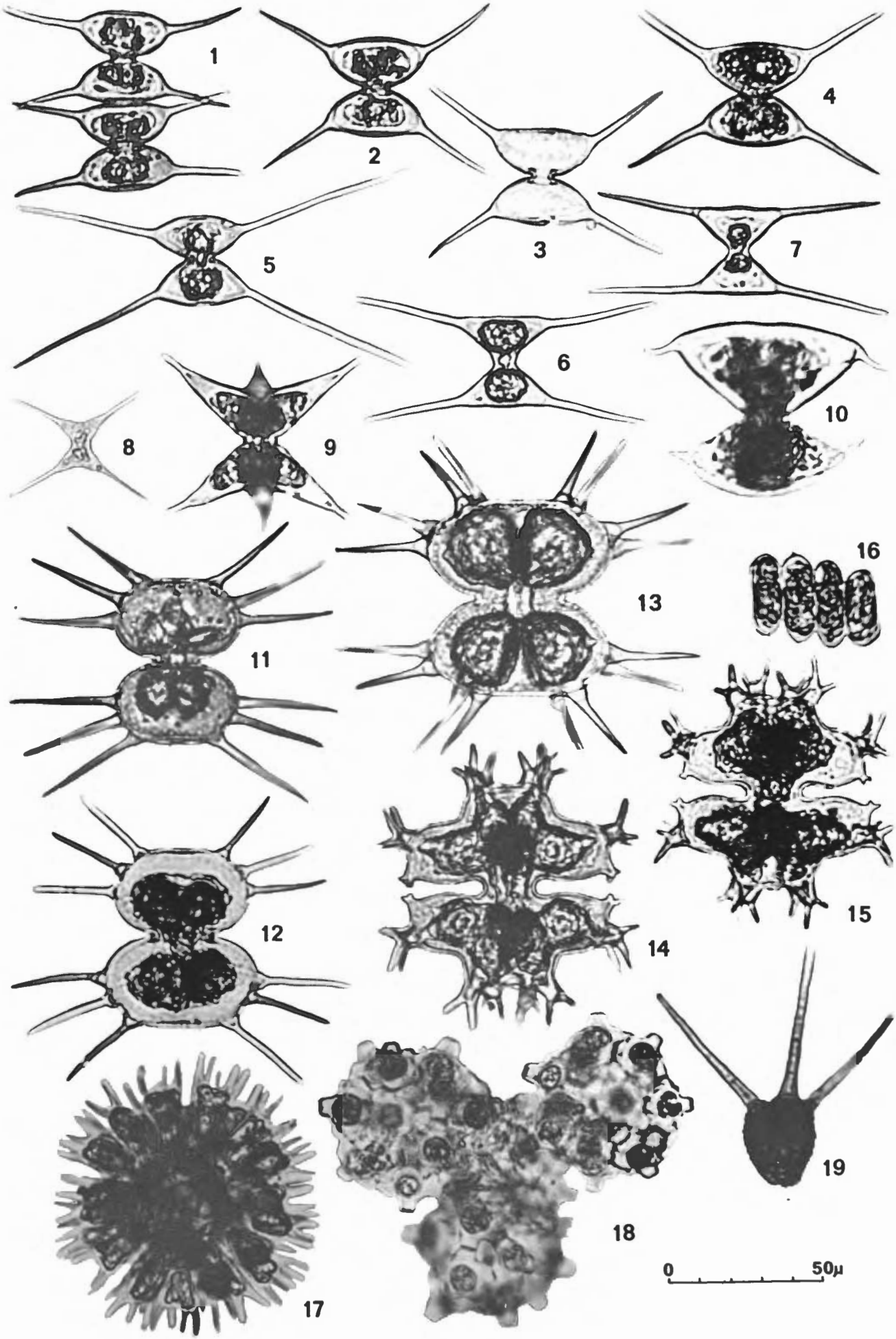

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PLATE XVII

EXPLANATION OF PLATE XVII.

1. *Staurastrum oxyacantha* v. *maius* SCOTT and GRÖNBL. forma, Jurucui.
2. *S. subanchora* GRÖNBL., Jurucui.
3. *S. glabribrachiatum* FÖRSTER, Maica.
4. *S. subindentatum* v. *lepidiforme* CROASD., Jurucui.
5. *S. jurucuiense* THOM., Jurucui.
6. *S. stelliferum* v. *evolutum* THOM., Jurucui.
7. *S. circulus* GRÖNBL.. forma, Jurucui.
8. *S. thienemannii* KRIEGER forma, Eva.
9. *S. spiculiferum* f. *minor* THOM., Maica.
10. *S. teliferum* v. *groenbladii* THOM., Jurucui.
11. *S. tentaculiferum* BORGE, Jurucui.
12. *S. rectangulare* BORGE forma, Jurucui.
13. *Penium spirostriolatum* f. *elongatum* THOM., Jurucui.
14-15. *Closterium porrectum* v. *borgei* (BORGE) FÖRSTER, Jurucui.
16. *C. baillyanum* f. *curvatum* THOM., Jurucui.
17. *Micrasterias laticeps* v. *ampliata* KRIEGER, Maica.
18. *M. alata* f. *gracilior* GRÖNBL., Jurucui.
19. *Goniaulax polygramma* STEIN ?, Maica.

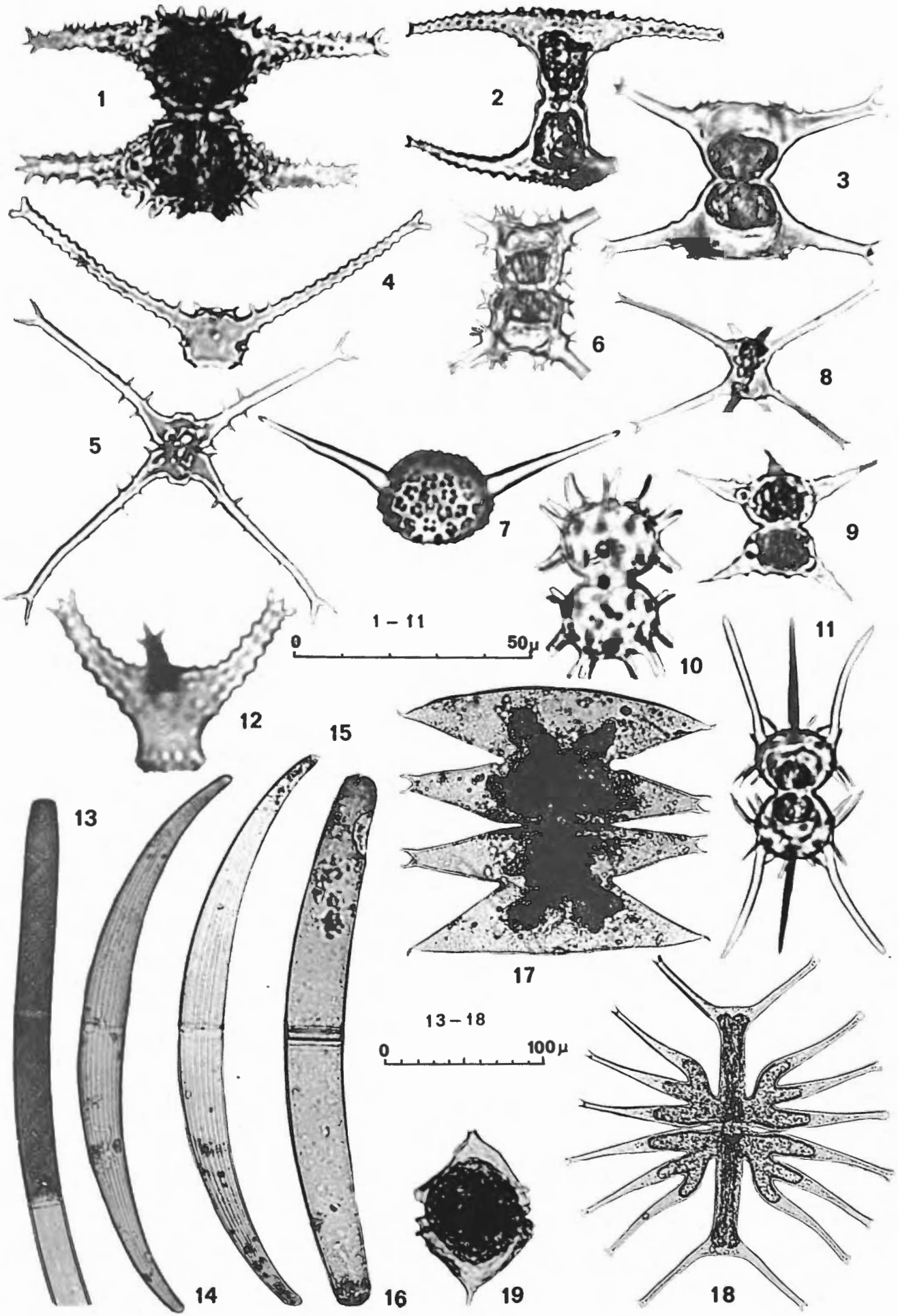

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PLATE XVIII

EXPLANATION OF PLATE XVIII.

1. *Staurastrum leptocladum* v. *africanum* G. S. WEST forma, Maica.
2. *S. leptocladum* v. *denticulatum* G. M. SMITH, Jurucui.
3. *S. leptocladum* v. *insigne* W. and W. em. GRÖNBL., Maica.
4. *S. brachioprominens* f. *minor* THOM., Maica.
5. *S. elongatum* v. *amazonense* SCOTT and GRÖNBL., Jurucui.
6. *S. tectum* BORGE, Jurucui.
7. *S. tectum* v. *ayayense* GRÖNBL., Maica.
8. *S. triundulatum* v. *brasiliense* GRÖNBL., Jurucui.

9-10. *S. submanfeldtii* v. *convergens* GRÖNBL. forma, Maica.

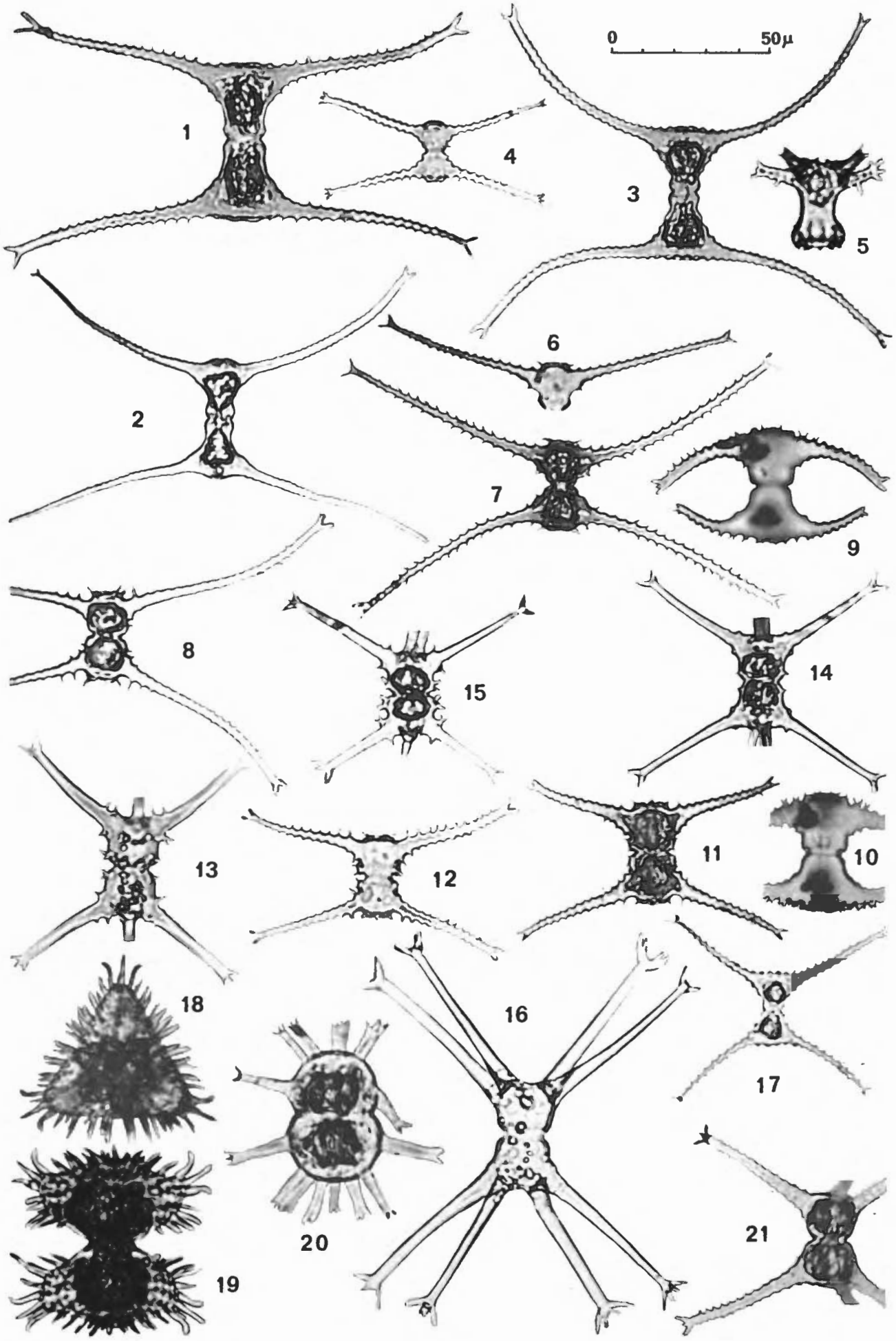
11-12. *S. subindentatum* v. *brasiliense* f. *sexspinulosum* FÖRSTER, Jurucui, Maica.

13-15. *S. stelliferum* v. *evolutum* THOM., Jurucui.

16. *S. stelliferum* BORGE, Jurucui.
17. *S. nodulosum* PRESCOTT forma, Maica.

18-19. *S. brebissonii* v. *brasiliense* GRÖNBL., Jurucui.

20. *S. wolleanum* v. *brasiliense* SCOTT and CROASD., Maica.
21. *S. cingulum* (W. and W.) G. M. SMITH, Maica.



K. THOMASSON. — Amazonian Algae.

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PLATE XIX

EXPLANATION OF PLATE XIX.

1-2. *Staurastrum saltans* v. *brasiliense* GRÖNBL., Jurucui.

3-5. *S. circulus* GRÖNBL. forma, Jurucui.

6. *S. pseudosebaldi* v. *elongatum* MESSIK., Maica.

7-11. *S. nova-caesareae* v. *brasiliense* (GRÖNBL.) FÖRSTER, Jurucui.

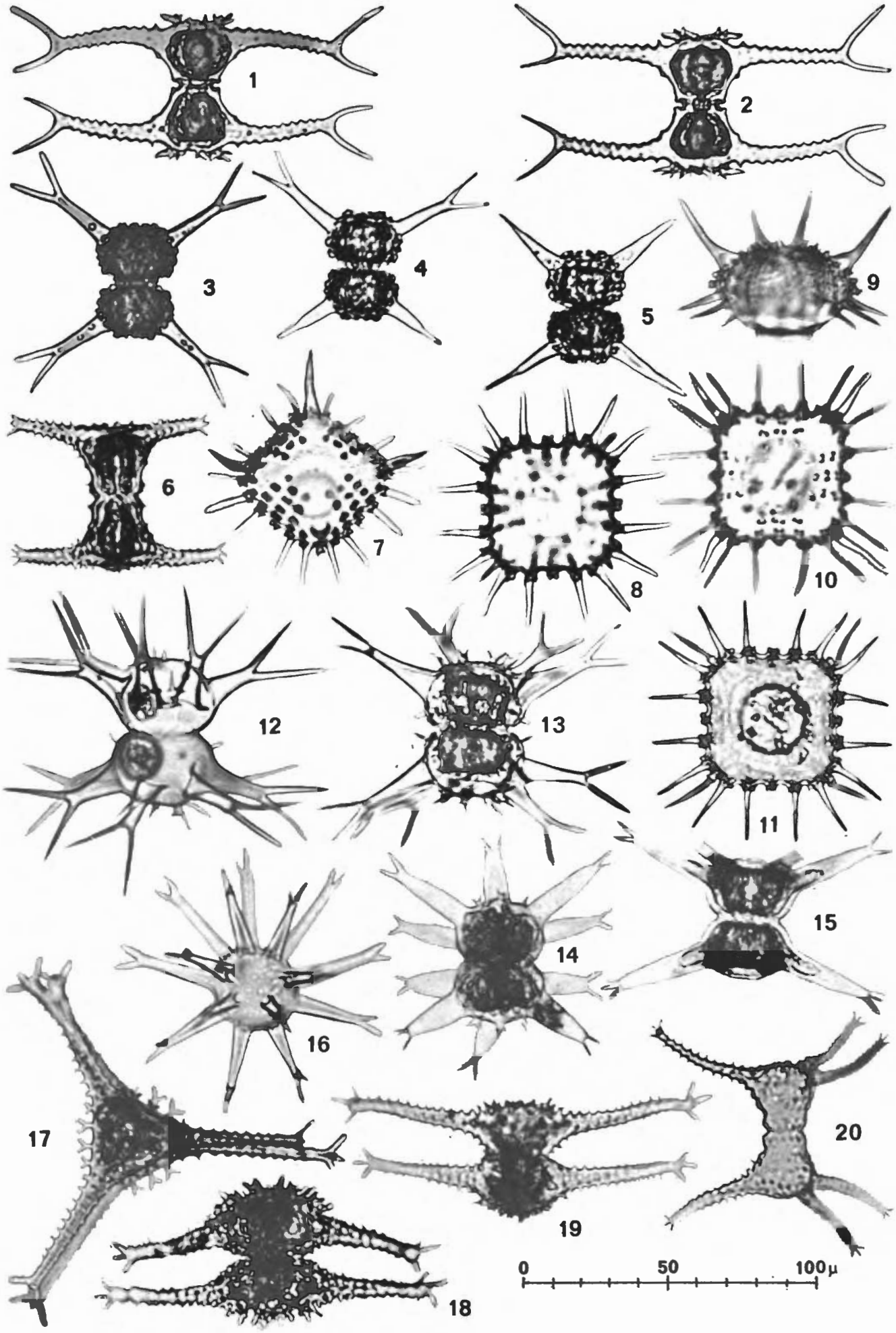
12-14. *S. boergesenii* RACIB., Jurucui, Maica.

15. *S. boergesenii* v. *trifidum* GRÖNBL., Maica.

16. *S. leptacanthum* NORDST., Jurucui.

17-19. *S. vestitum* v. *subanatinum* W. and W., Maica.

20. *S. siolii* f. *divergens* THOM., Maica.



K. THOMASSON. — Amazonian Algae.

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PLATE XX

EXPLANATION OF PLATE XX.

1-3. *Brachionus mirabilis* DADAY, Jurucui.

4-5. *B. zahniseri* v. *reductus* HAUER, Jurucui, Maica.

6. *Keratella americana* CARLIN, Jurucui.

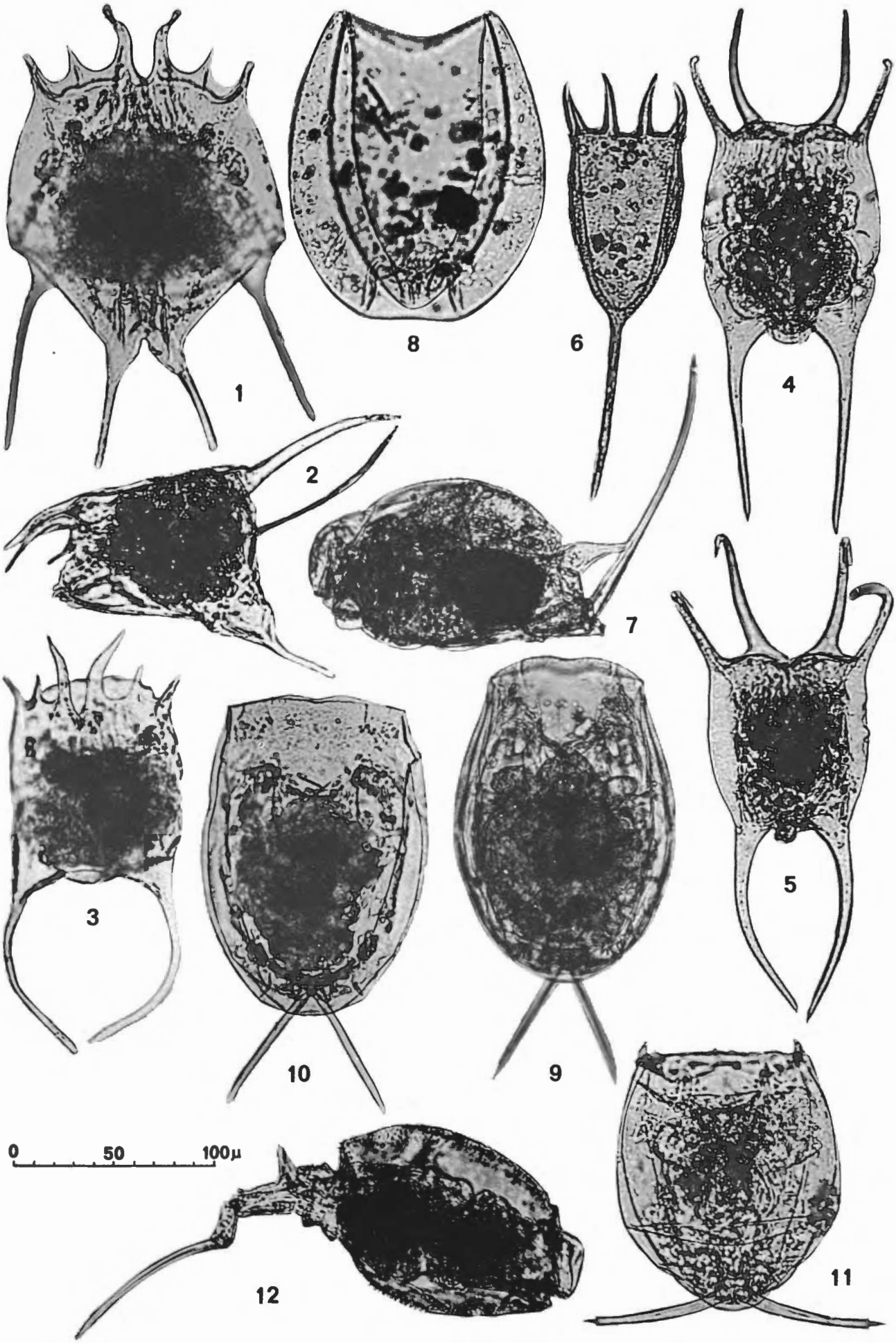
7. *Cephalodella mucronata* MYERS, Jurucui.

8. *Dipeuchlanis propatula* BEAUCHAMP, Jurucui.

9-10. *Lecane melini* THOM., Jurucui.

11. *L. curvicornis* (MURRAY), Maica.

12. *Trichotria tetractis* (EHRENB.), Maica.



K. THOMASSON. — Amazonian Algae.

Mus. Nat. d'Hist. des Sciences Naturelles de Belg. Bull.

PLATE XXI

EXPLANATION OF PLATE XXI.

1-2. *Lecane ploenensis* (VOIGT), Jurucui.

3-4. *L. pertica* HARRING and MYERS, Jurucui.

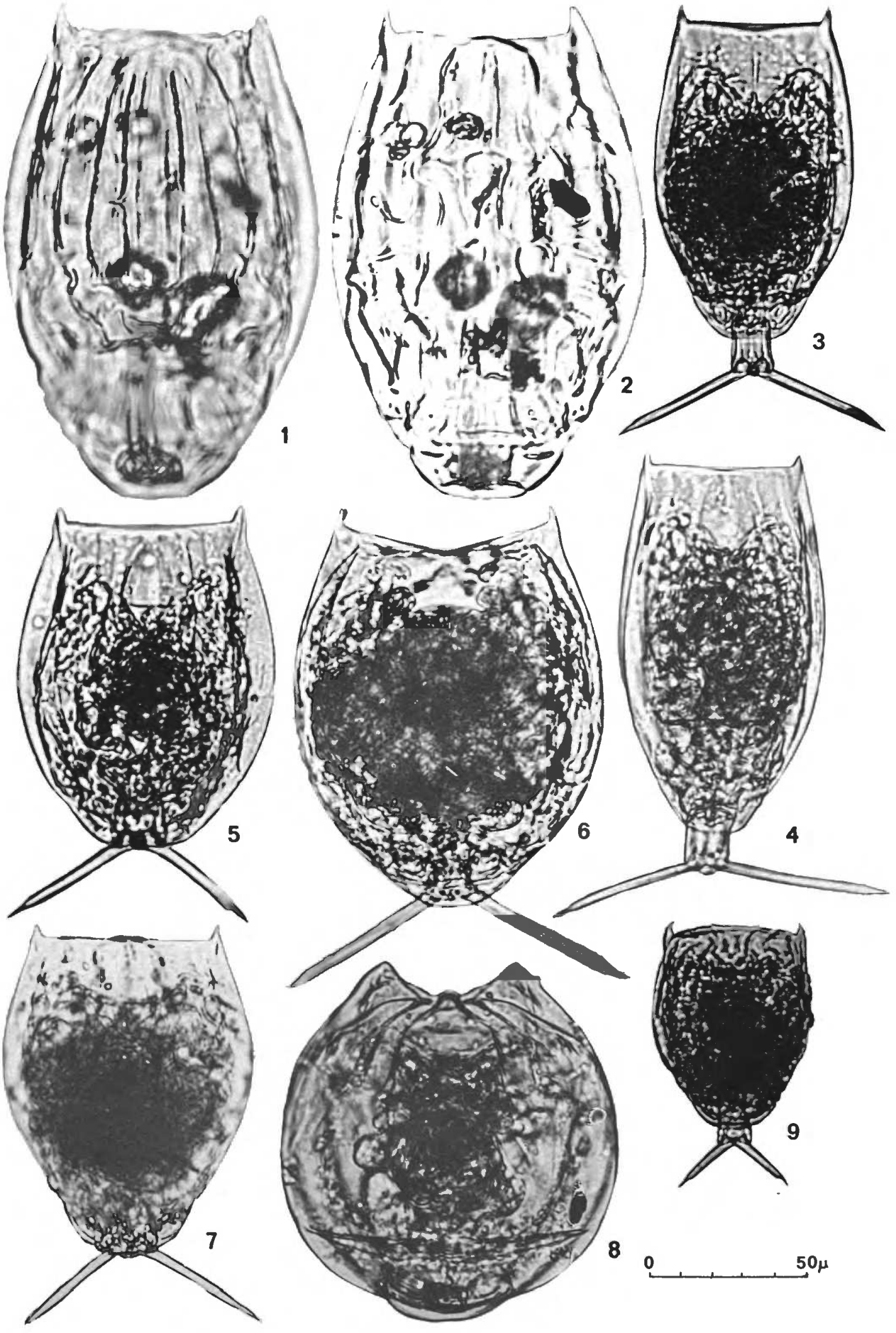
5. *L. saginata* HARRING and MYERS, Jurucui.

6. *L. curvicornis* (MURRAY), Maica.

7. *L. lauterborni* HAUER, Jurucui.

8. *L. cornuta* (MÜLLER), Maica.

9. *L. methoria* HARRING and MYERS, Maica.



K. THOMASSON. — Amazonian Algae.

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MUSEUM OF COMPARATIVE ZOOLOGY
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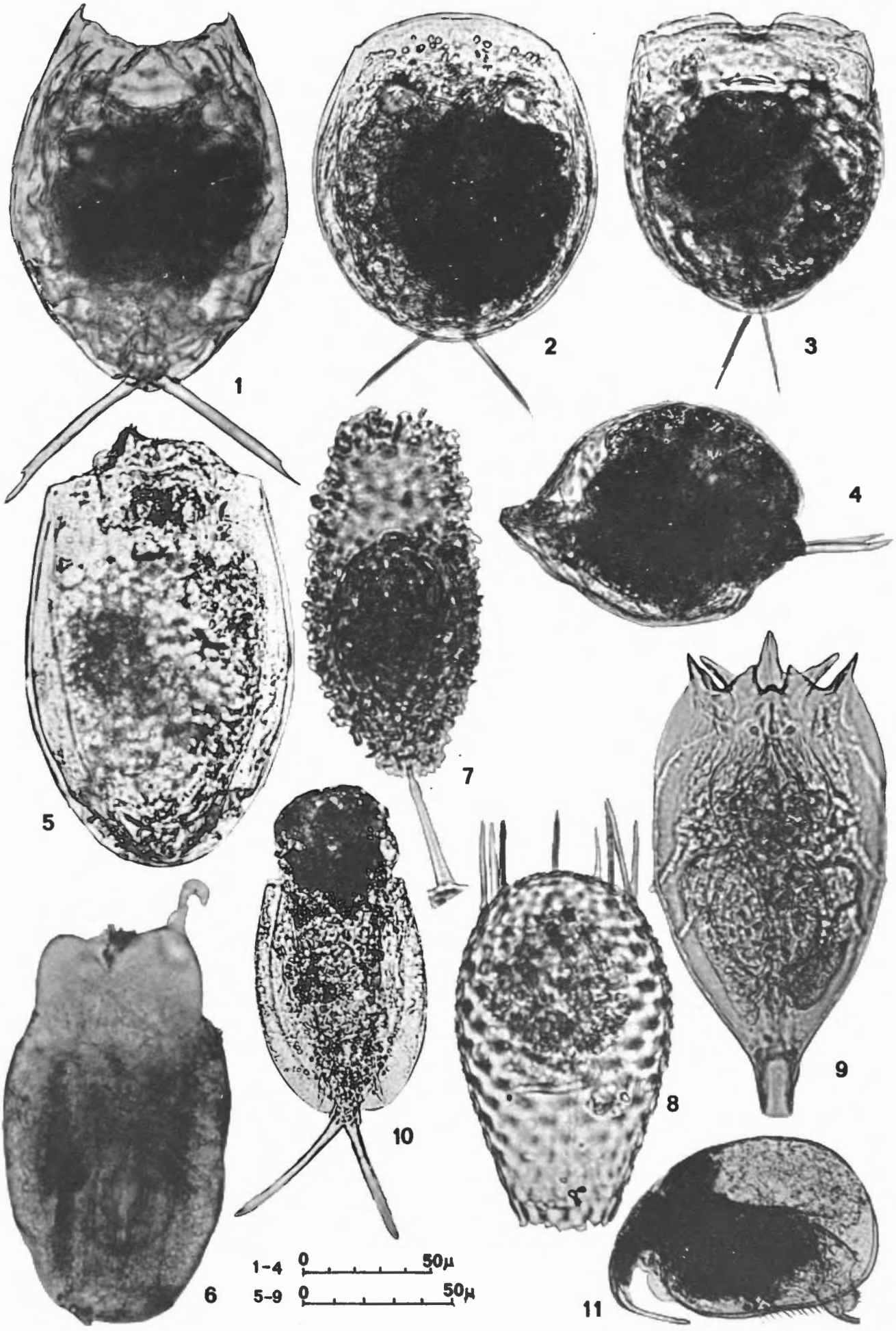
PLATE XXII

EXPLANATION OF PLATE XXII.

1. *Lecane curvicornis nitida* MURRAY, Jurucui.
2. *L. remanei* HAUER, Jurucui.
3-4. *L. proiecta* HAUER, Maica.
5. *L. melini* THOM., Maica.
6. Ciliate, Maica.
7. *Vagnicola*, Jurucui.
8. *Euglypha acanthophora* (EHRENB.), Jurucui.
9. *Testudinella tridentata amazonica* THOM., Jurucui.
10. *Dipeuchlanis propatula* BEAUCHAMP, Jurucui.
11. *Alonella* cf. *dadayi* BIRGE, Jurucui.



K. THOMASSON. — Amazonian Algae.

Acad. des SCIENCES NATURELLES de SCRANTON

PLATE XXIII

EXPLANATION OF PLATE XXIII.

1. *Lecane remanei* HAUER, Jurucui.

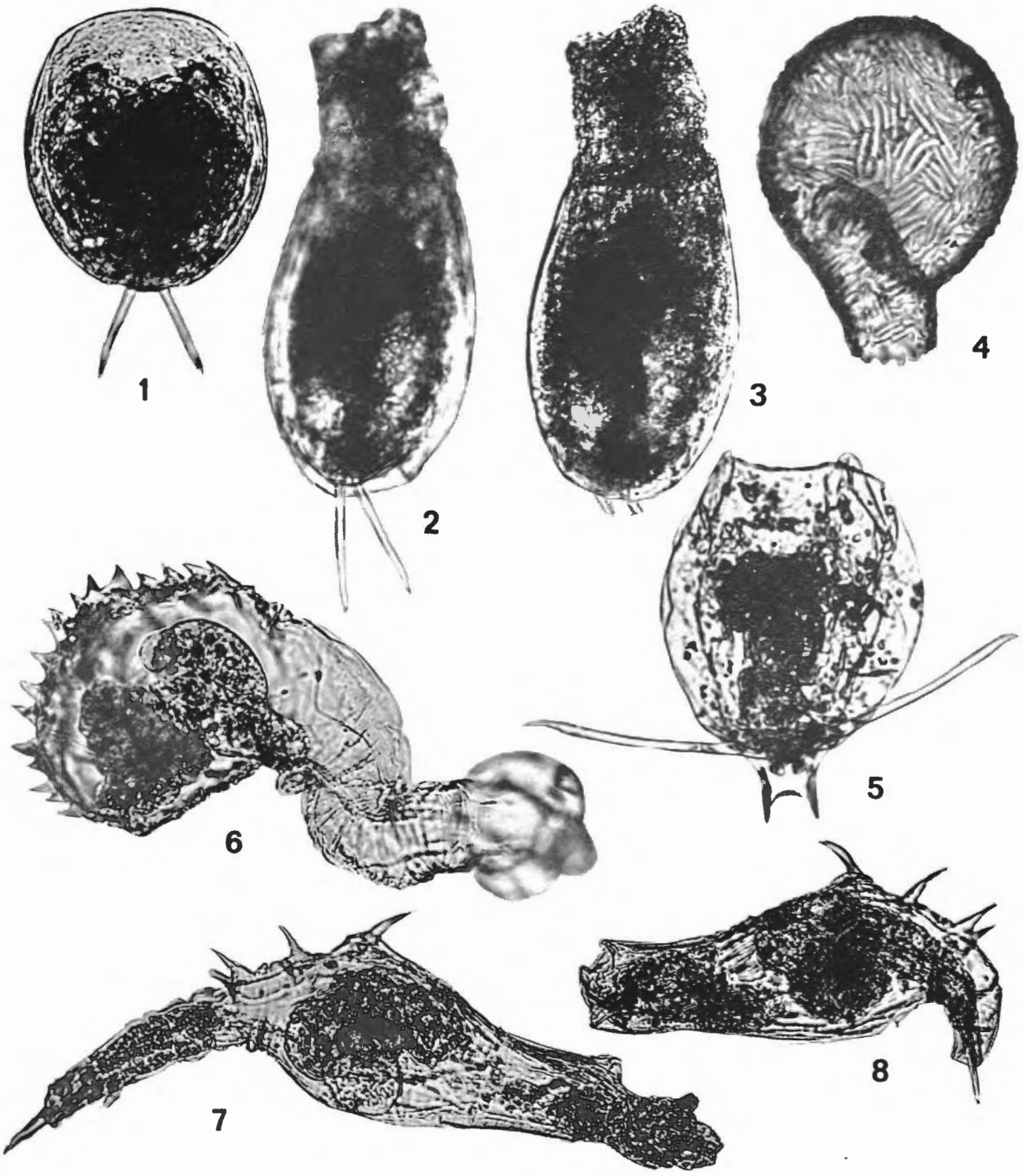
2-3. *Dipeuchlanis* sp., Jurucui.

4. *Lesquereusia spiralis* EHRENB., Jurucui.

5. *Lecane leontina* (TURNER), Maica.

6. *Sinantherina spinosa* (THORPE), Maica.

7-8. *Dissotrocha aculeata medioaculeata* (JANSON), Maica.



K. THOMASSON. — Amazonian Algae.

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PLATE XXIV

EXPLANATION OF PLATE XXIV.

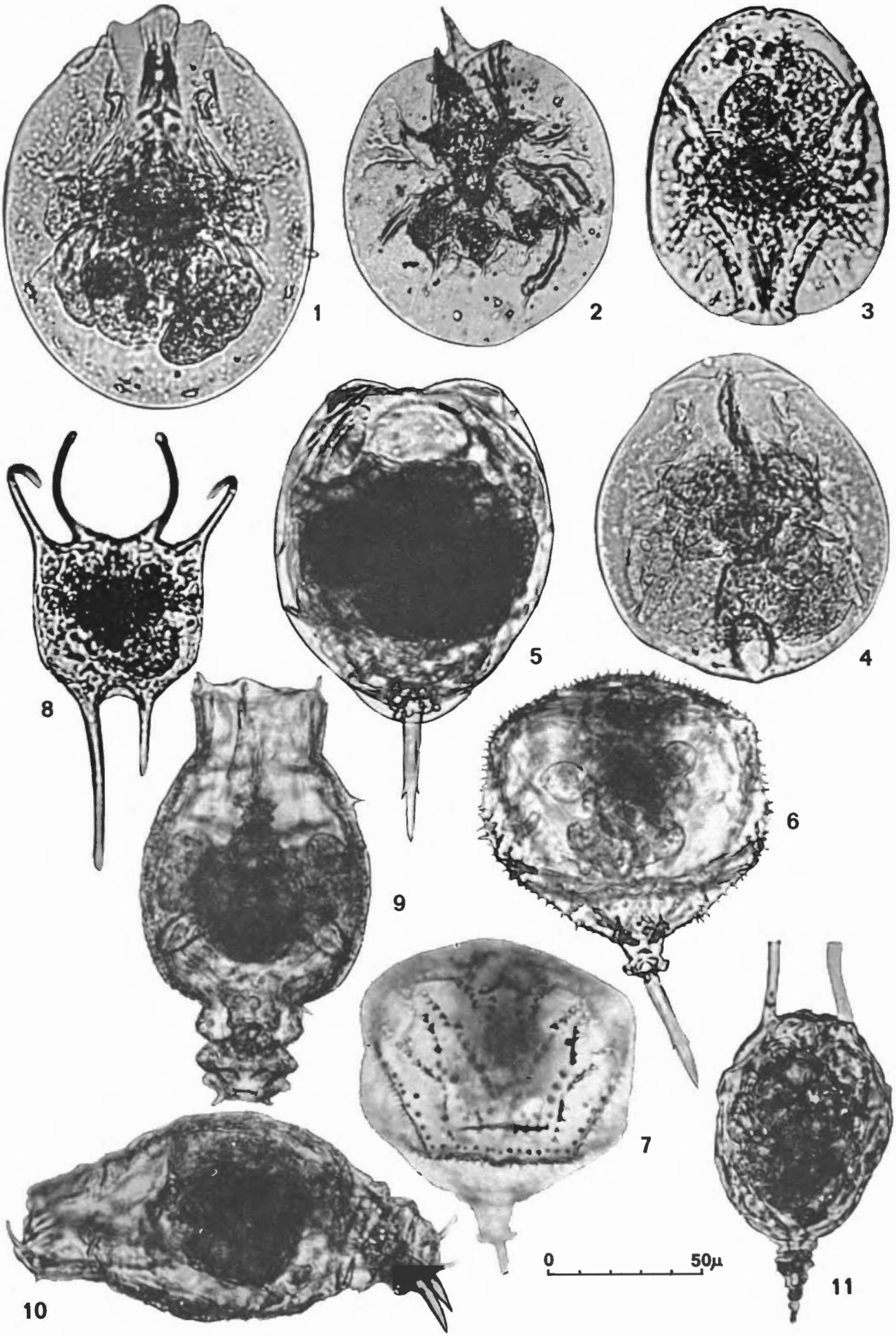
1. *Testudinella ahlstromi* HAUER, Jurucui.
2. *T. haueriensis* GILLARD, Maica.
3. *T. amphora* HAUER, Maica.
4. *T. semiparva* HAUER, Jurucui.
5. *Lecane murrayi* HAUER, Jurucui.

6-7. *L. armata* THOM., Jurucui.

8. *Brachionus gessneri* HAUER, Jurucui.

9-10. *Dissotrocha schlienzi* HAUER, Jurucui.

11. *Ptygura* sp., Maica.



K. THOMASSON. — Amazonian Algae.

INSTITUT ROYAL des SCIENCES NATURELLES de BELGIQUE

D/1971/0339/5

AMAZONIAN ALGAE

(STUDIES ON SOUTH AMERICAN FRESH-WATER PLANKTON. 8)

About hundred years ago NORDSTEDT (1870) wrote regarding the available information about the geographical distribution of desmids that « Brasilia adhuc non nisi unam speciem exhibuit : *Desmidium hexaceros* EHRENB ». Since then investigations of the desmids of Brazil have shown that there is an extremely rich and varied flora, at least equivalent to that of other tropical areas, and very probably the richest in the world. However, our present information is based only on random samples, and we are still stocktaking.

About fifteen years ago I had the opportunity to study a few samples from the Amazon basin and I became interested in seeing more of the flora. Some years ago, Dr. G. MARLIER asked me to work up his collections of copepods from Amazon basin, but being more interested in desmids I asked for phytoplankton collections and a number of samples were then placed at my disposal. As phycological studies are usually rather timeconsuming, only four samples were picked out for examination. Occasional notes were made on the occurrence of some other algae, in addition to desmids, partly in order to give some idea of the composition of prevailing phytoplankton communities (THOMASSON, 1967, p. 288), and partly because, apart from a few papers on diatoms and a paper on *Chlorococcales* and *Volvocales* (KAMMERER, 1938), little is known about algae other than desmids. Rotifers in the collections made by Dr. MARLIER have been worked up by GILLARD (1967). Here only a few occasional notes are recorded.

Since the days of HUMBOLT the Amazon basin has attracted the interest of many hydrobiologists. HUMBOLT was probably the first to point out the differences between the productivity of the black and white waters. He emphasized the meagerness of life in black waters, recently demonstrated by HAMMER (1965), for example. The physical environment of the Amazon has been the subject of numerous studies, but less has been done with regard to the living part of the ecosystem. Probably GESSNER's statement (GESSNER and HAMMER, 1967, p. 315) that « Der Grund für spärliches Wissen liegt dabei weniger an einer zu geringen Zahl an gesammelten Proben, als vielmehr am Mangel an Spezialisten, welche Zeit hätten, das Material zu bearbeiten » is applicable in many regions.

Since there are numerous limnographical papers on the physical environment, it seems to be quite unnecessary to use space here for a general review of the background for the life in Amazon waters. The reader is referred to the following papers, and to the literature quoted in them : BRAUN (1952), MARLIER (1965, 1967), FITTKAU (1964), GESSNER (1959, pp. 323-340, 1960*a*, 1960*b*, 1961), SIOLI (1955, 1957*a*, 1957*b*, 1961, 1963, 1964, 1965*a*, 1965*b*, 1965*c*, 1966*a*, 1966*b*), SIOLI and KLINGE (1961), KLINGE and OHLE (1964), and SIOLI in SCOTT, GRÖNBLAD and CROASDALE (1965, pp. 5-18). CARTER (1934), GESSNER (1965), and SCHUBART (1953) are also of interest in this connection.

For freshwater algae, the map published by FÖRSTER (1963, 1964) gives a good picture of the phycological investigations in Brazil. The desmid flora of Brazil has been more intensively studied than that of any other South American country, but it is noticable that most of the investigated areas are located around the Amazon basin. Only two are in the central part of the basin, viz. GRÖNBLAD (1945), FÖRSTER (1969), both at Santarém. In addition, SCOTT, GRÖNBLAD and CROASDALE (1965) list new records from the same area, and also from the Belém-Braganca area; and DROUET (1967) and PRESCOTT (1957) have some records from the Rio Santa Teresa area. In this paper, I have recorded the occurrence of some rotifers in the samples at my disposal. It should therefore be pointed out that our knowledge of the rotifers of the Amazon basin is based on two quite recent publications, HAUER (1965) and GILLARD (1967). All the studies mentioned above, like the present one, are based on random samples. I have studied only four samples, whereas GRÖNBLAD (1945) had 71, and the paper by SCOTT, GRÖNBLAD and CROASDALE (1965) is based on 43 samples, so the question of the randomness of my samples arises. In order to test this, a table of the algae recorded was drawn up, not originally intended for publication. However, it proved to be quite interesting, showing the relationship between the results of different investigations, and also the character of the algal flora of Amazon waters. Of course, one should remember that both the large collections which have been compared with the few samples at my disposal contain numerous samples poor in algae.

The samples collected by Dr. G. MARLIER are from the following bodies of water :

1. Lago Jurucui. — Located on a small affluent of the Rio Tapajós. A clear water lake with an area of more than 20 ha. Water temperature 29-31 °C, pH 4.8-5.5, conductivity K_{20} 8.6-11.4. µS. Limnographical and limnobiological description in BRAUN (1952, pp. 21-23, 33-37, 80-90, 93, 97-101, 111-118), and MARLIER (1965, pp. 40-41, 1967, p. 112). The sample studied was collected in August 15, 1963. Besides the algae and rotifers listed in the table below, there were quite a number of thecamoebae, e.g. *Arcella costata* EHRENB., *A. discoides* PERNARD, *A. gibbosa* PERNARD, *A. hemisphaerica* PERTY, *A. mitrata* LEIDY, *Euglypha acanthophora* (EHRENB.), fig. 22 : 8, *Euglypha* spp., *Lesquereusia spiralis* EHRENB., fig. 23 : 4, and a few cladocers, e.g. *Bosmina hagmanni* STINGELIN, *Leptorynchus dentifer* DADAY, and *Rhynchotalona falcata* (G. O. SARS), fig. 22 : 11.

2. Lago Maica. — A white water lake, located downstreams from Santarém. Water temperature 29-30 °C, pH 5.2. Limnographical information in MARLIER (1965, p. 4, 1967, pp. 112-113). The sample, collected August 18, 1963, is dominated by *Melosira granulata* (EHRENB.) RALFS. In addition to the species in the table below, the occurrence of *Bosminella anisitsi* DADAY, *Ceriodaphnia cornuta* SARS, *Chydorus sphaericus* O. F. MÜLLER and a *Diaphanosoma* should be mentioned.

3. Lago Rio Preto da Eva. — A lateral lake with black humic water located downstream from the mouth of the Rio Negro. Water temperature 26-31.4 °C, pH 4.5-5.8, K_{20} 4-10 µS. Limnographical and limnobiological description in MARLIER (1965, pp. 29-40, 1967, pp. 106-

111). *Staurastrum stelliferum* BORGE was the predominant plankter on March 2, 1964. There were also quite a number of *Melosira granulata* (EHRENB.) RALFS. On April 23, 1964, however, *Peridinium inconspicuum* LEMM. was the predominant plankter, together with a narrow, 1.6 μ, filamentous alga. The chloroplast of this alga was spoiled by the preservative. Next in importance, quantitatively, was *Staurastrum stelliferum* BORGE, and *S. lepidum* v. *latecurvatum* GRÖNBL. Only one theread of *Melosira granulata* (EHRENB.) RALFS was observed. Apart from these differences in relative abundance, there were no significant changes in composition of plankton between the two sampling occasions. The two sampling occasions are therefore aggregated in the table below. A possible cause of the differences might be that the first sampling date is within the circulation period, whereas the second one is in a period of stability in which production is higher than that during the overturn. In addition to the plankters listed below, *Bosminopsis deitersi* RICHARD was observed.

Geographically, Lago Jurucui and Lago Maica are both located in the Santarém region, within the area already partly covered by the investigations of GRÖNBLAD (1945). The Rio Arapiuns area, see Map A in SCOTT, GRÖNBLAD and CROASDALE (1965) is adjoining. Lago Rio Preto da Eva is located in the Manaus region, about which there is no previous phycological information apart from the very sparse notes in THOMASSON (1955, p. 214). With regard to rotifers, the greater part of HAUER's (1965) material is from the Manaus region, with only two samples from the Santarém region. Accordingly, the following studies have been used for the comparison in the table below : for the *Chlorococcales* and *Volvocales*, KAMMERER (1938), covering the same area as GRÖNBLAD (1945), for *Desmidiaceae*, GRÖNBLAD (1945), SCOTT, GRÖNBLAD and CROASDALE (1965), FÖRSTER (1969), for rotifers, HAUER (1965) and GILLARD (1967). In the table, some alternations have been made in order to bring the nomenclature almost up-to-date. It is exceptionally fortunate that such information, produced by highly qualified hydrobiologists is available for comparison. The documentation in these papers is excellent and the majority of records are verified with figures. It has been impossible to make full use of the important study on desmids of Santarém area by FÖRSTER (1969). Because that paper was published a couple of years after this one was submitted to the publisher.

Following abbreviations have been used in the table below :

f. = fig. or figs., l. = length, b. = breadth, and S.G.C. = SCOTT, GRÖNBLAD and CROASDALE.

	Jurucui	Maica	Eva	
CYANOPHYTA				
Anabaena affinis	..	+	..	
A. circinalis	..	+	..	syn. : *A. spiroides* v. *latizona*
Aphanizomenon elenkinii	..	+	..	
Chroococcus turgidus	+	..	..	
Gomphosphaeria lacustris	..	+	..	
Merismopedia glauca	+	..	+	
M. tenuissima	..	+	..	
Microcystis aeruginosa	..	+	..	
M. elongata	..	?	..	
M. flos-aquae	..	+	..	
Oscillatoria agardhii	..	+	..	
O. limosa	+	+	+	
O. planctonica	..	+	..	
O. princeps	..	+	..	
Oscillatoria sp.	..	+	..	diam. 16 μ
Raphidiopsis mediterranea	..	+	..	
Stigonema ocellatum	+	..	..	benthic
EUGLENOPHYTA				
Euglena acus	..	..	+	
E. acus f. *viguieri*	..	+	..	
E. allorgei	..	+	..	
E. oxyuris	..	+	..	
E. spirogyra	..	+	..	l. 156.5 μ
E. texta	..	+	..	
E. tripteris	..	+	..	f. 6 : 17, l. 180 μ
Lepocinclis ovum	+	..	..	
Petalomonas sp.	+	..	..	
Phacus anomalus	..	+	..	
P. curvicauda	..	+	..	
P. longicauda	..	+	..	f. 6 : 16
P. longicauda v. *insecta*	..	+	..	cf. Kiss (1950), Conrad (1943)
P. platalea v. *maior*	..	+	..	f. 1 : 1, 6 : 13-15
P. swirenkoi	..	?	..	f. 11 : 22, l. 36 μ, b. 28 μ
P. tortus	..	+	..	cf. Kiss (1950)
Trachelomonas armata v. *longispina*	..	+	..	f. 1 : 2
T. curta	..	..	..	Lago Redondo
T. hispida	..	+	..	
T. hispida v. *coronata*	..	+	..	
T. spinosa	+	..	..	f. 11 : 8
T. sydneyensis	..	+	..	f. 11 : 21, l. 35 μ
T. sydneyensis v. *obesa* f. *longispina*	..	+	..	f. 11 : 19
T. volvocina	..	+	..	
T. zingeri forma	..	+	..	f. 1 : 3, 11 : 20, l. 46-48 μ, b. 30 μ
PYRRHOPHYTA				
Glenodinium pernardiforme	..	..	+	f. 5 : 6
Glenodinium sp.	..	+	..	
Gonyaulax digitale	..	..	+	f. 5 : 5, 7 : 16-17
G. polygramma	..	?	..	f. 17 : 19

	Jurucui	Maica	Eva	
Peridinium aciculiferum	+	..	..	
P. borgei	+	..	..	
P. gatunense	+	..	..	
P. gatunense ad. v. *madagascariense*	+	..	..	
P. inconspicuum	+	..	+	
Peridinium from *palatinum* group	+	..	..	striated plates
Peridinium sp.	..	..	+	
CHRYSOPHYTA				
XANTHOPHYCEAE				
Centritractus africanus	+	..	..	
C. belonophorus	..	+	..	f. 9 : 15
Tetraedriella regularis	..	+	..	f. 1 : 4, diam. 40 μ
CHRYSOPHYCEAE				
Bicosoeca lacustris	..	+	..	
Chrysococcus cordiformis	+	..	..	
Chrysopyxis iwanoffii	+	..	..	f. 5 : 4
Derepyxis ollula v. *ovata*	+	..	..	f. 9 : 16, l. 28 (36) μ
Dinobryon cylindricum v. *alpinum*	..	+	..	
D. divergens	..	+	..	
D. sertularia	..	..	+	
Mallomonas sp.	+	+	..	
DIATOMOPHYCEAE				
Melosira ambigua	+	+	..	
M. granulata	+	+	+	Lago Jari
M. granulata f. *curvata*	..	+	..	
Rhizosolenia braunii forma	+	..	..	f. 10 : 12-13
R. eriensis	+	+	+	
R. longiseta	+	+	+	
Tabellaria flocculosa f. *asterionelloides*	..	..	..	Lago Jari
Diatoma elongata	..	+	..	
D. vulgare	+	..	..	
Fragilaria construens	+	..	..	
Synedra acus	..	..	+	
S. cyclopum	+	..	..	
S. ulna v. *danica*	..	+	..	
Actinella brasiliensis	+	..	..	f. 9 : 17
A. guianensis	+	..	+	f. 9 : 18
A. mirabilis	+	..	..	f. 10 : 6, l. over 258 μ
Eunotia flexuosa	?	..	..	l. 400 μ
E. lunaris	+	..	..	
E. robusta	+	..	..	
E. subrobusta	+	..	..	f. 9 : 20, 11 : 24, l. 90-100 μ
E. triodon	+	..	..	l. 36 μ
E. zygodon	..	+	..	f. 9 : 19, l. 96 μ, b. 24 μ
Surirella arcta	..	?	..	f. 6 : 1, 7 : 6
S. didyma	+	..	..	
S. guatimalensis	..	+	+	
S. linearis v. *constricta*	+	..	..	

	Jurucui	Maica	Eva	Kammerer	
CHLOROPHYTA					
VOLVOCALES					
Chlamydomonas sp.	..	..	+	..	
Carteria sp.	+	..	..	..	
Gonium pectorale	..	..	..	+	
Pandorina morum	..	+	..	+	
Eudorina elegans	..	+	..	+	Lago Redondo
Pleodorina illinoisensis	..	+	..	+	f. 13 : 6
Volvulina steinii	..	..	+	..	reported from Amazon by GESSNER (1931)
Volvox sp.	+	+	..	..	
TETRASPORALES					
Tetraspora sp.	+	..	..	..	
Gloeocystis australis v. *ampla*	..	..	..	+	
Gloeococcus schroeteri	..	+	..	+	
CHLOROCOCCALES					
Chlorococcum gigas v. *maxima*	..	..	..	+	
Tetraëdron caudatum	+	..	..	..	
T. limneticum	..	+	..	..	
T. lunula	..	..	..	+	cysts of *Peridinium* or *Cystodinium*
Schroederia setigera	..	+	..	..	
Oocystis solitaria	..	..	..	+	
Treubaria euryacantha	..	..	+	..	
T. triappendiculata	..	+	..	..	
T. varia	..	+	..	..	f. 10 : 9, frequent
Nephrocytium allanthoideum	..	..	..	+	
N. lunatum	..	..	..	+	
Oonephris obesa	..	..	..	+	
Kirchneriella contorta	..	..	..	+	
K. lunaris	..	..	..	+	
K. lunaris v. *dianae*	..	..	..	+	
K. obesa v. *aperta*	..	..	..	+	
Selenastrum bibraianum	+	+	..	+	
Ankistrodesmus braunii	..	..	..	+	
A. convolutus v. *obtusus*	..	..	..	+	
A. dulcis	..	..	..	+	
A. falcatus	+	+	+	+	
A. falcatus v. *acicularis*	..	..	..	+	probably *Raphidionema longiseta*
A. longissimus v. *tropicus*	..	..	..	+	
Micractinium pusillum	..	..	..	+	
Botryococcus braunii	+	+	+	..	
Westella botryoides	..	..	..	+	
W. natans	..	..	..	+	
Dimorphococcus lunatus	+	+	..	+	
Dictyosphaerium ehrenbergianum	..	..	..	+	
D. pulchellum	..	+	+	+	

	Juruena	Maica	Eva	Kammerer	
Coelastrum cambricum	+	+	+	+	f. 16 : 18, cf. Bohlin (1897, f. 2 : 23-24)
C. cambricum v. *intermedium*	..	..	..	+	
C. microporum	+	..	..	..	
C. reticulatum	..	..	+	+	
C. scabrum	..	..	..	+	
Crucigenia quadratum	..	..	..	+	
C. rectangularis	..	..	..	+	
C. tetrapedia	..	..	..	+	
Tetrastrum glabrum	..	..	..	+	
T. staurogeniaeforme	..	..	..	+	
Scenedesmus acuminatus	..	..	..	+	
S. acutus	..	+	..	..	
S. arcuatus v. *platydisca*	..	..	..	+	
S. brasiliensis	+	..	+	+	
S. curvatus	..	..	..	+	
S. denticulatus	..	..	..	+	
S. denticulatus v. *australis*	..	..	..	+	
S. dispar	+	..	..	..	
S. ecornis	+	..	+	+	
S. ecornis v. *disciformis*	..	..	..	+	
S. ecornis f. *granulatus*	+	..	..	..	f. 16 : 16
S. lunatus	..	..	..	+	
S. perforatus	..	..	..	+	
S. praetervisus	..	..	..	+	
S. quadricauda v. *quadrispina*	+	..	..	+	f. 11 : 23
S. quadricauda v. *maximus*	+	..	..	..	
S. striatus	+	..	..	..	
Actinastrum hantzschii	..	+	..	+	
Tetrallantos lagerheimii	..	+	..	..	
Pediastrum biradiatum	..	..	..	+	
P. boryanum	..	..	..	+	
P. boryanum v. *ornatum*	..	..	..	+	
P. duplex	..	+	..	+	
P. duplex f. *cohaerens*	..	..	..	+	
P. gracillimum	+	+	..	..	
P. simplex	+	..	..	+	incl. *P. clathratum*, rare
P. tetras	+	..	..	+	
P. tetras v. *tetraodon*	..	..	+	..	
Sorastrum americanum	+	..	..	+	f. 16 : 17
S. spinulosum	..	..	..	+	
Ulotrichales					
Gloeotila turfosa	+	..	..	..	
Oedogoniales					
Oedogonium pulchrum	+	..	..	..	
O. spirale	+	..	..	..	f. 8 : 12, diam. oospore 56 μ
Oedogonium sp.	+	..	..	..	f. 8 : 13
Bulbochaete imperialis	+	..	..	..	f. 8 : 14-15, oospore 120 × 72 μ

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
Desmidiales							
Spirotaenia acuta	..	..	..	+	..	..	
S. condensata	..	..	..	+	..	+	
Cylindrocystis brebissonii	..	..	..	..	+	+	
C. crassa	..	..	..	..	..	+	
C. ovalis	..	..	..	..	..	+	
Netrium digitus	+	..	+	+	+	..	
N. digitus v. *elegans*	+	..	..	..	..	..	
N. digitus f. *elliptica*	+	..	..	..	..	..	
N. digitus v. *lamellosum*	..	..	..	+	+	..	
N. digitus v. *latum*	..	..	+	..	..	..	
N. digitus v. *naegelii*	..	..	..	+	..	..	
N. digitus v. *parvum*	..	..	..	+	+	..	
N. digitus v. *rectum*	..	..	..	+	..	..	
N. interruptum	..	..	..	..	+	..	
N. interruptum f. *minus*	..	..	..	..	..	+	
N. oblongum v. *cylindricum*	..	..	..	..	..	+	
Roya pseudoclosterium	..	..	..	+	..	..	
Gonatozygon aculeatum	+	..	..	+	..	+	
G. brebissonii	..	..	..	+	..	..	
G. kinahani	..	..	..	+	..	+	
G. kinahani v. *interruptum*	..	..	..	..	..	+	
G. kinahani forma	..	..	..	..	..	+	
G. monotaenium	..	..	..	..	..	+	
G. monotaenium v. *angustum*	..	..	..	+	..	+	
G. monotaenium v. *pilosellum*	..	..	..	..	..	+	
G. monotaenium v. *pilosellum* forma	..	..	..	..	..	+	
G. pilosum	..	..	..	..	..	+	
Closterium abruptum	..	..	..	+	+	..	
C. abruptum v. *brevius*	..	..	..	..	..	+	
C. acerosum	..	..	..	+	..	..	
C. aciculare	..	+	..	+	..	+	
C. acutum	..	..	+	+	+	..	
C. acutum v. *variabile*	..	+	+	+	..	..	
C. angustatum forma	..	..	..	+	..	..	
C. archerianum	..	..	..	..	+	..	
C. attenuatum	..	..	..	+	+	..	
C. bacillum	..	..	..	..	..	+	
C. baillyanum	..	..	..	..	+	..	
C. baillyanum f. *curvatum*	+	..	..	..	..	..	f. 6 : 3, 17 : 6
C. braunii	..	..	..	+	..	..	
C. calosporum	..	..	..	..	..	+	
C. calosporum v. *brasiliense*	..	..	..	+	..	..	
C. compactum v. *minus*	..	..	..	..	+	..	
C. cornu	..	..	..	+	..	..	
C. costatum	+	+	..	..	..	..	f. 6 : 9, 8 : 7-9, 14 : 11
C. costatum v. *subcostatum*	+	..	..	..	..	..	
C. costatum v. *westii*	..	..	..	+	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
C. cynthia	..	..	..	+	..	+	
C. dianae	..	..	..	+	+	+	
C. dianae v. *brevius*	..	..	..	..	..	+	
C. dianae v. *compressum*	..	..	..	..	..	+	
C. dianae v. *pseudodianae*	..	..	..	+	..	..	
C. didymotocum	+	..	..	..	..	..	
C. ehrenbergii	..	..	..	+	..	+	
C. ehrenbergii f. *angustum*	..	..	..	..	..	+	
C. gracile	..	..	..	+	..	+	
C. gracile f. *angulata*	..	..	..	+	..	..	
C. gracile v. *elongatum*	..	..	..	+	..	..	
C. incurvum	..	..	..	+	..	..	
C. intermedium	..	..	..	+	..	..	
C. jenneri	..	..	..	+	..	..	
C. johnsonii	..	..	..	..	..	+	
C. juncidum	..	..	..	+	..	..	
C. kuetzingii	..	+	..	+	+	+	
C. kuetzingii f. *croasdaleae*	..	..	..	..	+	+	
C. kuetzingii forma	..	..	..	..	..	+	
C. kuetzingii v. *vittatum*	+	..	..	+	..	..	
C. lagoense v. *crassius*	..	..	..	+	..	..	
C. lanceolatum	+	..	..	+	..	..	
C. laterale	..	..	..	+	..	..	
C. leibleinii	..	..	..	+	..	..	
C. libellula	..	..	..	+	+	..	
C. libellula v. *angusticeps*	..	..	..	+	..	..	
C. libellula v. *intermedium*	..	..	..	+	+	+	
C. libellula v. *interruptum*	..	..	..	..	+	+	
C. lineatum	..	..	..	+	..	..	
C. lunula	+	..	..	..	+	..	f. 6 : 6, 8, 7 : 3
C. lunula v. *coloratum*	+	..	..	..	..	..	
C. lunula v. *intermedium*	..	..	..	..	..	+	
C. lunula v. *maximum*	+	..	..	+	..	..	
C. lunula forma	+	..	..	..	..	..	f. 6 : 7
C. macilentum	+	..	..	+	..	..	f. 7 : 2, 14 : 12
C. macilentum f. S.G.C.	..	..	..	..	+	+	
C. malinvernianum forma	..	..	..	+	..	..	
C. malmei	..	..	..	+	..	+	
C. moniliferum	..	..	..	+	+	..	
C. moniliferum v. *concavum*	..	..	..	..	..	+	
C. nasutum	..	..	..	+	..	+	
C. navicula	..	+	..	+	+	+	
C. navicula v. *crassum*	..	..	..	..	+	+	
C. nematodes v. *proboscideum*	..	..	..	+	..	..	
C. parvulum	..	..	..	+	..	+	
C. parvulum v. *angustum*	..	..	..	+	..	+	
C. parvulum v. *maius*	..	+	..	..	..	..	
C. polystichum	..	+	..	..	..	..	

	Juruena	Maica	Eva	Grönblad	S.G.C.	Förster	
C. porrectum	..	..	..	+	+	..	
C. porrectum v. *angustatum*	..	..	..	+	..	..	
C. porrectum v. *borgei*	+	..	..	..	..	..	f. 8 : 10-11, 17 : 14-15
C. porrectum forma	..	..	..	..	..	+	
C. praelongum	..	+	..	..	..	..	
C. pronum	..	+	+	+	+	+	
C. pronum forma	..	..	..	+	..	..	
C. pseudolunula	..	..	..	+	..	..	
C. pseudolunula v. *concavum*	..	..	..	..	..	+	
C. pygmaeum	..	..	..	+	..	..	
C. ralfsii v. *gracilius*	..	..	..	+	..	..	
C. ralfsii v. *hybridum*	..	..	..	+	..	..	
C. regulare f. *minus*	..	..	..	..	..	+	
C. setaceum	..	+	..	+	+	+	
C. setaceum v. *vittatum*	..	..	..	+	..	..	
C. striolatum	..	..	..	..	+	..	
C. subulatum	..	..	..	+	+	..	
C. subulatum v. *maius*	..	..	..	..	..	+	
C. toxon	..	..	..	..	+	..	
C. tumidum	..	..	..	+	..	..	
C. turgidum	..	..	..	+	+	..	
C. turgidum v. *borgei*	+	..	..	+	..	..	f. 6 : 4-5, 8 : 6
C. turgidum v. *groenbladii*	..	..	..	..	..	?	
C. venus	..	..	..	+	+	+	
Penium cylindrus	..	..	..	+	..	+	
P. exiguum	..	..	..	+	..	..	
P. margaritaceum	..	..	..	+	..	..	
P. polymorphum	..	..	..	+	..	+	
P. silvae-nigrae	+	..	..	..	..	..	
P. spirostriolatum	+	..	..	+	..	..	
P. spirostriolatum f. *elongatum*	+	..	..	..	..	..	
P. subspirostriolatiforme	..	..	..	+	..	..	
Pleurotaenium burmense	..	..	..	+	..	..	
P. burmense v. *brasiliense*	+	..	..	+	..	..	
P. burmense v. *extensum*	..	..	..	+	..	..	
P. caldense	..	..	..	+	..	..	
P. caldense v. *granulatum*	..	..	..	+	..	..	
P. coronatum	..	..	+	..	+	+	
P. coronatum v. *fluctuatum*	+	..	+	..	..	+	f. 4 : 5-6, 5 : 3, 7 : 13-15, 10 : 8
P. coronatum v. *fluctuatum* f. *minus*	..	..	..	..	..	+	
P. coronatum v. *robustum*	..	..	..	..	+	..	
P. cylindricum v. *stuhlmanii*	..	..	..	+	..	+	
P. ehrenbergii v. *elongatum*	..	..	..	..	..	+	
P. ehrenbergii v. *undulatum*	..	..	..	+	..	..	
P. elatum	..	..	..	+	..	..	
P. elatum v. *alternans*	..	+	..	+	..	..	f. 7 : 5
P. eugeneum	..	+	..	..	..	..	
P. eugeneum v. *undulatum*	..	+	..	+	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
P. minutum	..	..	..	+	+	+	f. 7 : 4
P. minutum v. *attenuatum*	..	..	..	+	..	+	
P. minutum v. *bourrellyi*	..	..	..	..	+	+	
P. minutum v. *crassum*	..	..	..	..	+	+	
P. minutum v. *cylindricum*	..	..	..	+	..	+	
P. minutum v. *elongatum*	..	..	..	+	..	+	
P. minutum v. *excavatum*	..	..	+	..	..	+	
P. minutum v. *gracile*	..	..	..	+	+	+	
P. minutum v. *latum*	..	..	..	+	..	..	
P. minutum v. *subattenuatum*	..	..	..	..	..	+	
P. nodosum	..	..	..	+	..	..	
P. nodosum v. *borgei*	..	..	..	+	..	..	
P. nodosum v. *gutwinskii*	..	..	..	+	..	..	
P. nodulosum v. *borgei*	..	..	..	+	..	..	
P. spinulosum	+	..	..	..	..	..	l. 425 μ
P. trabecula	..	+	..	+	..	+	
P. trabecula v. *maximum*	..	..	..	+	..	..	
P. trabecula v. *rectum*	..	..	..	+	..	+	
P. tridentulum v. *hexacanthum*	..	..	..	+	+	..	
P. tridentulum v. *tenuissimum*	..	..	..	..	+	+	
P. truncatum	..	..	..	..	+	..	
P. verrucosum	+	..	..	+	..	..	f. 10 : 7, l. 343 μ
Docidium baculum	..	..	..	..	..	+	
D. baculum v. *parallelum*	..	..	..	+	+	..	
D. hexagonum	..	..	..	..	+	+	
D. undulatum	..	..	..	..	+	..	
Triploceras gracile	..	..	..	+	..	..	
T. gracile v. *aculeatum*	..	+	..	..	..	..	
T. gracile v. *bidentatum*	+	+	+	+	+	+	f. 14 : 1
T. verticillatum	..	..	..	+	..	..	
Tetmemorus brebissonii	..	..	..	..	+	..	
T. granulatus	..	..	..	..	+	+	
T. granulatus v. *attenuatus*	+	..	..	+	..	..	
T. laevis	..	..	..	+	+	+	
T. laevis v. *minutus*	..	..	..	..	+	..	
Euastrum abruptum v. *subglaziowii*	..	..	..	..	..	+	
E. ansatum v. *longum*	..	..	..	+	..	..	
E. attenuatum v. *brasiliense*	..	..	..	+	..	..	
E. bidentatum v. *peruvianum*	..	..	..	..	..	+	
E. binale v. *hians*	+	..	..	..	..	..	
E. binale v. *hians* forma	..	..	..	..	..	+	
E. binale v. *rostratum*	..	..	..	+	..	..	
E. biocellatum	..	..	..	..	+	..	
E. boldtii	..	..	..	+	..	..	
E. brasiliense	..	..	..	..	+	..	
E. brasiliense v. *convergens*	+	+	+	..	..	..	f. 1 : 6, 12 : 5-8
E. brasiliense v. *minus*	..	..	..	..	+	..	
E. brasiliense forma	..	..	+	..	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
E. ciastonii v. *ornatum*	..	..	..	..	..	+	
E. confusum	..	..	..	..	..	+	
E. cornubiense v. *brasiliense*	..	..	..	..	..	+	
E. cuspidatum v. *goyazense*	..	..	..	..	+	+	
E. deflandrei	..	..	..	+	..	..	
E. denticulatum	..	..	..	..	+	+	
E. denticulatum v. *angusticeps*	..	..	..	+	..	..	
E. divergens v. *brasiliense*	..	..	..	+	..	..	
E. elegans v. *brasiliense*	..	..	..	+	..	..	
E. elegans forma	..	..	..	+	..	..	
E. elongatum	..	..	..	+	..	..	
E. engleri	..	..	..	..	..	+	
E. evolutum	..	..	..	+	+	..	
E. evolutum v. *columbianum*	..	..	..	+	..	..	
E. evolutum v. *integrius* forma	..	..	..	..	..	+	
E. evolutum v. *monticulosum* forma	..	..	+	..	..	..	f. 12 : 9
E. evolutum v. *perornatum*	+	..	+	..	+	+	f. 11 : 3, 12 : 10-11, l. 60-73 μ, b. 44-48 μ
E. evolutum formae	..	..	..	+	..	..	
E. fissum v. *brasiliense*	..	..	..	+	..	+	
E. fittkaui	..	..	..	..	..	+	
E. flammeum v. *subkalimantanum*	..	..	..	..	..	+	
E. foersteri	..	..	..	..	+	+	
E. gayanum	..	..	..	+	..	..	
E. gayanum v. *angulatum*	..	..	..	..	..	+	
E. gemmatum	+	..	..	..	..	..	l. 35.2 μ
E. gemmatum f. *latior*	..	..	..	+	..	..	
E. gemmatum v. *monocylum*	..	..	..	..	..	+	
E. gemmatum v. *perforatum*	..	..	..	..	..	+	
E. gemmatum f. *porosum*	..	..	..	..	..	+	
E. gemmatum v. *tenuius*	..	..	..	..	+	..	
E. groenbladii	..	..	..	..	+	..	
E. inerme v. *brasiliense*	..	..	..	..	..	+	
E. insulare	..	..	..	..	+	..	
E. intermedium v. *corpulentum*	..	..	..	..	+	..	
E. intermedium v. *longicolle*	..	..	..	+	..	..	
E. inusitatum	..	..	..	..	+	..	
E. inusitatum v. *reversum*	..	..	..	..	+	..	
E. inusitatum f. *spinosum*	..	..	..	..	+	..	
E. inusitatum v. *symmetricum*	..	..	..	..	+	..	
E. latipes	..	..	..	+	..	..	
E. latipes f. *evolutum*	..	..	..	+	..	+	
E. loefgrenii	..	..	..	..	..	+	
E. luetkemuelleri v. *carniolicum*	..	..	..	+	..	..	
E. mononcylum v. *ayayense*	..	+	..	+	..	..	
E. mononcylum v. *borgei*	..	+	..	+	..	..	
E. obliqueporum	+	..	..	..	..	+	f. 11 : 2
E. oculatum	..	..	..	+	..	..	
E. ornans	..	..	+	..	..	+	f. 1 : 7, 11 : 7

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
E. paulense v. *caicarense*	..	..	..	..	..	+	
E. personatum v. *subpersonatum*	..	..	..	+	..	..	
E. platycerum v. *acutilobum*	..	..	..	+	..	..	
E. politum	..	..	..	..	+	..	
E. pseudopirassunungae	..	..	..	..	..	+	
E. pulchellum	..	..	..	+	..	..	
E. quadriceps	..	..	..	+	..	..	
E. rectangulare	..	..	..	+	..	..	
E. securiformiceps	..	..	..	..	+	..	
E. securiformiceps v. *punctulatum*	..	..	..	..	+	..	
E. sibiricum	..	..	..	+	..	..	
E. simia	..	..	..	+	..	..	
E. sinuosum	..	..	..	..	+	..	
E. sinuosum v. *brasiliense*	..	..	..	..	+	..	
E. sinuosum v. *gangense*	..	..	..	..	+	..	
E. sinuosum v. *scrobiculatum*	..	..	..	..	..	+	
E. sinuosum v. *subgangense*	..	..	..	..	..	+	
E. sinuosum v. *subgangense* f. *ellipticum*	..	..	..	..	..	+	
E. sinuosum v. *subjenneri*	..	..	..	..	..	+	
E. siolii	..	..	..	..	+	..	
E. spinulosum v. *grandiornatum*	..	..	..	..	..	+	
E. subhexalobum v. *scrobiculatum*	..	..	..	+	..	..	
E. subintegrum v. *brasiliense*	..	..	..	+	..	..	
E. sublobatum	..	..	..	+	..	..	
E. sublobatum v. *dentiferum*	..	..	..	..	..	+	
E. sublobatum v. *kriegeri*	+	..	..	..	..	..	l. 19.5 μ
E. sublobatum v. *notatum*	..	..	..	+	..	..	
E. sublobatum v. *obtusatum*	..	..	..	+	..	..	
E. sublobatum v. *subangustatum*	..	..	..	..	..	+	
E. subornatum v. *brasiliense*	..	..	..	..	..	+	
E. subtrilobulatum	+	..	..	..	+	..	l. 30 μ
E. subtrilobulatum formae	..	..	..	..	+	..	
E. triangulum	..	..	..	+	..	..	
E. triporosum	..	..	..	..	..	+	
E. turneri	..	..	..	+	..	..	
E. validum	..	..	..	+	..	..	
E. validum v. *glabrum* formae	..	..	..	..	+	..	
Micrasterias abrupta	..	..	..	+	..	+	
M. abrupta v. *borgei*	..	..	..	+	..	..	
M. alata	..	..	..	+	+	+	
M. alata f. *gracilior*	+	+	+	+	+	+	f. 14 : 6-8, 17 : 8
M. arcuata	+	..	..	..	+	+	f. 11 : 4, 12 : 2-3
M. arcuata v. *borgei*	..	..	..	..	..	+	
M. arcuata v. *compacta*	..	..	..	..	..	+	
M. arcuata v. *gracilis*	..	..	..	..	+	..	
M. arcuata v. *robusta* f. *goyazensis*	..	..	..	..	..	+	
M. arcuata v. *robusta* f. *recurvata*	..	..	..	..	..	+	
M. arcuata v. *subpinnatifida*	..	..	..	+	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
M. borgei	..	+	+	+	+	+	f. 7 : 12
M. borgei f. *minor*	..	+	..	..	..	..	f. 14 : 5
M. borgei v. *quadriverrucosa*	+	..	..	..	..	..	f. 7 : 10-11, 12 : 4
M. crux-melitensis v. *janeira*	..	..	..	..	+	..	
M. foliacea	+	..	..	..	..	..	
M. foliacea v. *ornata*	..	..	..	+	..	..	
M. laticeps	..	+	..	+	..	..	l. 120 µ, rare
M. laticeps v. *acuminata*	..	+	..	..	..	..	
M. laticeps v. *ampliata*	..	+	..	+	..	..	f. 17 : 17
M. laticeps v. *minor*	..	..	..	+	..	+	
M. ledouxii	..	..	..	..	+	..	
M. ledouxii v. *simpliciformis*	..	..	..	..	+	..	
M. mahabuleshwarensis	..	..	..	+	..	..	
M. mahabuleshwarensis v. *ampullacea*	+	+	..	+	..	+	f. 13 : 5
M. mahabuleshwarensis v. *ampullacea* forma	..	..	..	..	..	+	
M. mahabuleshwarensis forma	..	..	..	..	+	..	
M. pinnatifida	..	..	..	+	+	+	
M. pinnatifida v. *pseudoscitans*	..	..	..	..	+	..	
M. radians v. *brasiliensis*	..	+	+	+	..	+	Grönblad (1945, f. 82), rare
M. radiata v. *gracillima*	+	+	..	+	+	+	f. 5 : 1, 14 : 2-3
M. radiata v. *groenbladii*	+	+	+	+	+	+	f. 13 : 4, 14 : 4
M. radiosa	..	..	..	+	..	+	
M. radiosa v. *aculeata*	..	..	..	+	..	..	
M. radiosa v. *ornata*	..	..	..	+	..	..	
M. radiosa v. *ornata* f. *elegantior*	+	+	..	+	..	+	rare
M. radiosa forma	..	..	..	+	..	..	
M. ringens	..	..	..	+	..	..	
M. rotata	+	..	..	..	+	..	f. 6 : 12, 7 : 7-9, 12 : 20
M. rotata v. *evoluta*	..	..	..	+	..	..	
M. schweinfurthii v. *ornata* f. *eckertii*	..	..	..	..	..	+	
M. simplex v. *minor*	..	..	..	..	+	..	
M. siolii	..	..	..	..	+	..	
M. siolii f. *simplicior*	..	..	..	..	+	..	
M. subaequalis	..	..	..	+	+	..	
M. subincisa v. *brasiliensis*	..	..	..	..	+	..	
M. subincisa v. *minima*	..	..	..	..	+	..	
M. tetraptera v. *spinulosa*	..	..	..	+	..	..	
M. torreyi	..	..	+	..	..	..	
M. torreyi v. *borgei*	..	..	..	..	..	+	
M. torreyi v. *curvata*	..	..	..	+	+	+	
M. torreyi v. *nordstedtiana*	+	..	..	+	+	..	
M. tropica	..	..	..	+	..	..	
M. tropica v. *brasiliensis*	..	..	..	+	..	..	
M. truncata f. *gibbosa*	+	..	+	..	..	..	f. 12 : 1, 13 : 1-3
M. truncata v. *pusilla*	..	..	..	..	+	..	
M. truncata forma	..	..	..	..	+	..	
Actinotaenium clevei	+	..	..	..	+	..	l. 64-72 µ
A. cruciferum v. *pluriradiatum*	..	..	..	+	+	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
A. cucurbita	..	..	..	..	+	..	
A. cucurbita f. *maius*	..	..	..	..	+	..	
A. cucurbita f. *minus*	..	..	..	..	+	..	
A. cucurbita f. *rotundatum*	..	..	..	..	..	+	
A. cucurbita forma	..	..	..	+	..	..	
A. cucurbitinum	..	..	..	+	+	..	
A. cucurbitinum v. *angustum*	..	..	..	+	..	..	
A. cucurbitinum v. *longum*	..	..	..	..	+	+	
A. cucurbitinum f. *maius*	..	..	..	..	..	+	
A. cucurbitinum v. *minutum*	..	..	..	..	+	..	
A. cucurbitinum v. *subpolymorphum*	..	..	..	..	+	..	
A. cucurbitinum forma	..	..	..	..	?	..	
A. curtum f. *minus*	..	..	..	..	+	..	
A. diplosporum	..	..	..	+	..	..	
A. globosum	..	..	..	..	+	+	
A. inconspicuum	..	..	..	+	..	..	
A. minutissimum	..	..	..	+	..	..	
A. obcuneatum	..	..	..	..	..	+	
A. perminutum	..	..	..	+	..	..	
A. palangula	..	..	..	..	..	+	
A. peniomorphum v. *latius*	..	..	..	..	..	+	
A. rufescens	..	..	..	..	..	+	
A. subglobosum	..	..	..	+	+	..	
A. tumidum v. *brasiliense*	..	..	+	+	..	+	f. 11 : 1, l. 68 μ, b. 24 μ
A. tumidum v. *brasiliense* f. *minus*	..	..	..	..	..	+	
A. tumidum forma	..	..	..	..	+	..	
A. turgidum	..	..	..	+	..	..	
A. turgidum v. *ligatum*	..	+	..	..	..	..	f. 1 : 5
A. viride	..	..	..	..	..	+	
A. wollei	..	..	..	..	+	+	
Cosmarium amoenum	..	..	..	+	..	..	
C. areguense	..	..	..	+	..	..	
C. bimamillatum	..	..	..	+	..	..	
C. binum	..	..	..	+	..	..	
C. bioculatum	..	..	..	..	..	+	
C. bipunctatum	..	..	..	..	..	+	
C. bireme v. *huzelii*	..	..	..	..	..	+	
C. bitriangulum	..	+	..	+	..	+	f. 11 : 12, l. 24 μ, b. 28 μ
C. bitriangulum v. *groenbladii*	..	..	..	+	..	+	
C. blyttii	..	..	..	+	..	..	
C. brasiliense	..	..	..	..	..	+	
C. capense v. *nyassae*	..	..	..	..	+	..	
C. clepsydra v. *fluviatile*	..	..	..	+	..	+	
C. commissurale v. *acutum*	..	..	..	..	..	+	
C. commissurale v. *crassum*	..	+	..	+	..	+	l. 28 μ, Nordstedt (1870, f. 3 : 19)
C. connatum	+	..	+	..	..	..	f. 9 : 9, l. 88 μ, b. 64 μ
C. contractum	+	+	..	+	..	+	f. 11 : 6
C. contractum v. *ellipsoideum*	..	..	..	..	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
C. contractum v. *minutum*	..	..	..	+	..	+	
C. contractum v. *sparsipunctatum*	..	..	..	..	..	+	
C. contractum forma	..	..	..	..	..	+	
C. crenatiforme	..	..	..	+	..	..	
C. crenatiforme f. *minor*	..	..	..	+	..	..	
C. cruciferum f. *latior*	..	..	..	+	..	..	
C. cymatonotophorum	..	..	..	+	..	..	
C. decoratum	..	..	..	+	..	+	
C. decussiferum v. *mediogranulatum*	+	..	..	..	..	+	
C. denticulatum	..	..	..	+	..	..	
C. denticulatum v. *ovale*	..	..	..	+	..	+	
C. denticulatum v. *perspinosum*	+	..	..	+	..	..	f. 9 : 3, l. 164 (172) μ
C. denticulatum v. *rotundatum*	..	..	..	+	+	..	
C. denticulatum v. *rotundatum* f. *mediolaeve*	+	..	+	..	..	+	f. 9 : 1-2
C. denticulatum v. *triangulare*	..	+	..	+	..	+	
C. depressum v. *achondrum*	..	..	..	..	..	+	
C. depressum v. *elevatum*	..	..	..	+	..	..	
C. depressum f. *minuta*	..	..	..	+	..	..	
C. dichondrum	..	..	..	+	..	..	
C. dichondrum v. *subhexagonum*	..	..	..	..	..	+	
C. difficile v. *dilatatum*	..	..	..	+	..	..	
C. dimaziforme v. *concavum*	..	..	..	..	+	+	
C. distortum v. *spinuliferum*	..	..	..	..	..	+	
C. exasperatum v. *subornatum*	..	..	..	..	..	+	
C. excavatum	..	..	..	+	..	..	
C. excavatum v. *longum*	..	..	..	+	..	..	
C. exiguum	..	..	..	+	+	+	
C. fuellebornii	..	..	..	+	..	..	
C. galeritum v. *westii*	..	..	..	..	..	+	
C. geminatum	..	..	..	+	..	..	
C. geminatum v. *scottii*	..	..	..	..	..	+	
C. geometricum	..	..	..	+	..	..	
C. ginzbergeri	..	..	..	+	..	..	
C. gonioides v. *subturgidum*	..	..	..	+	..	..	
C. gonioides v. *triquetrum*	..	..	..	+	..	..	
C. granatum	..	..	..	..	..	+	
C. groenbladii	+	..	..	+	..	..	f. 10 : 1-3
C. groenbladii v. *rotundatum*	+	..	..	..	..	..	f. 10 : 10
C. hexagonum	..	+	..	+	..	..	
C. impressulum	..	..	..	+	..	..	
C. incrassatum v. *brasiliense*	..	..	..	..	..	+	
C. isthmium v. *brasiliense*	..	..	..	+	..	..	
C. isthmochondrum v. *ornatum*	..	..	..	+	..	..	
C. kanitzii v. *brasiliense*	..	..	..	+	..	..	
C. kjellmanii v. *grande*	..	..	..	+	..	..	
C. laeve	..	..	..	+	..	..	
C. laeve v. *brasiliense*	..	..	..	..	+	..	
C. laeve v. *reniforme*	..	..	..	..	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
C. lagoense	..	..	..	+	..	..	
C. lagoense v. *amoebum*	..	..	..	..	..	+	
C. lagoense v. *cornigerum*	..	+	..	+	..	..	f. 9 : 10-11, l. 50 (64) μ b. 56 (68) μ
C. lagoense v. *horridum*	..	..	..	+	..	..	
C. lagoense v. *octihastatum*	..	..	..	..	..	+	
C. logiense	..	..	..	+	..	..	
C. lundellii	..	..	..	+	..	..	
C. lundellii v. *capense*	..	..	..	+	..	..	
C. luscum	..	..	..	+	..	..	
C. magnificum	..	..	..	+	..	..	
C. majae	..	..	..	+	..	..	
C. mamilliferum	..	..	..	+	..	..	
C. margaritatum	+	..	..	..	..	..	
C. margaritatum f. *minor*	..	..	..	+	..	..	
C. margaritiferum v. *brasiliense*	..	..	..	..	..	+	
C. minimum	..	..	..	+	..	..	
C. moerlianum v. *brasiliense*	..	..	..	..	..	+	
C. moniliforme	..	..	..	+	..	..	
C. moniliforme v. *pseudofuellebornii*	..	..	..	..	..	+	
C. moniliforme f. *punctatum*	..	..	..	..	..	+	
C. moniliforme forma	..	..	..	..	+	..	
C. monomazum v. *dimaziforme*	..	..	..	+	..	..	
C. monomazum v. *dimazum*	..	..	..	+	..	..	
C. naviculare	+	..	..	..	..	..	
C. nitidulum	+	..	..	..	..	+	f. 9 : 8, l. 46 μ, b. 32 μ
C. novae-semliae	..	..	..	+	..	..	
C. nymannianum	..	..	..	+	..	..	
C. obsoletum	..	+	..	..	..	+	l. 35 μ
C. obtusatum	..	..	..	+	..	..	
C. ocellatum v. *incrassatum*	..	..	..	+	..	..	
C. ordinatum	..	..	..	+	..	..	
C. ordinatum v. *borgei*	..	..	+	..	..	..	
C. ornatum	..	..	..	..	..	+	
C. ornatum v. *pseudolagoense*	+	..	..	..	..	+	f. 11 : 8-11
C. orthostichum v. *pumilum*	..	..	..	..	..	+	
C. pachydermum	..	..	..	+	..	..	
C. pachydermum v. *aethiopicum*	..	..	..	+	..	..	
C. parvulum	..	..	..	..	+	..	*Actinotaenium* ?
C. paulense v. *rotundatum*	..	..	..	+	..	..	
C. phaseolus forma	..	..	..	+	..	..	
C. polymorphum v. *groenbladii*	..	..	..	+	..	+	
C. polymorphum v. *ornatum*	..	..	..	+	..	..	
C. portianum v. *nephroideum*	..	..	..	+	..	..	
C. pseudoamoenum	..	..	..	+	..	..	
C. pseudoblyttii	..	..	..	+	..	..	
C. pseudobroomei	..	..	..	+	..	..	
C. pseudobroomei v. *parigranulatum*	..	..	..	..	..	+	
C. pseudoconnatum	+	..	..	+	+	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
C. pseudoconnatum f. *maior*	..	..	..	..	+	..	
C. pseudoconnatum forma	..	..	..	..	+	..	
C. pseudodecoratum	..	..	..	..	..	+	
C. pseudoexiguum	..	..	..	+	..	..	
C. pseudomagnificum f. *brasiliense*	+	+	+	..	..	+	
C. pseudopachydermum forma	+	..	..	+	..	..	f. 9 : 4-7
C. pseudopyramidatum	+	..	..	+	+	..	
C. pseudopyramidatum v. *borgei*	..	..	..	..	..	+	
C. pseudopyramidatum f. *minus*	..	..	..	..	+	+	
C. pseudopyramidatum v. *oculatum*	..	..	..	..	..	..	
C. pseudopyramidatum v. *stenonotum*	..	..	..	+	..	..	
C. pseudotaxichondrum v. *longii*	..	..	..	..	+	+	
C. pseudotaxichondrum v. *longii* forma	+	..	..	..	+	..	f. 11 : 13, l. 15 μ, b. 19.5 μ
C. pseudotaxichondrum v. *paulense*	..	..	..	+	..	..	
C. pseudotaxichondrum v. *sublongii*	..	..	..	..	..	+	
C. pseudotaxichondrum forma	..	..	..	..	+	..	
C. pseudovariolatum	..	..	..	+	..	..	
C. pusillum	..	..	..	+	..	..	
C. pyramidatum	..	..	..	..	+	..	
C. quadratulum	..	..	..	..	..	+	
C. quadrifarium v. *hexastichum*	+	..	..	..	..	..	
C. quadrum	..	..	..	+	..	..	
C. quinarium f. *irregulare*	..	..	..	..	+	..	
C. redimitum	+	..	..	+	..	+	f. 9 : 12, l. 64 μ, b. 40 μ
C. regnellii	..	..	..	+	..	..	
C. regnesii	+	..	..	..	..	..	
C. regnesii v. *productum*	..	..	..	+	..	..	
C. scottii v. *sculpturatum*	..	..	..	..	..	+	
C. scrobiculosum	..	..	..	+	..	..	
C. securiforme v. *brasiliense*	..	..	..	+	..	..	
C. sexnotatum v. *tristriatum*	..	..	..	+	..	..	
C. simplicius	..	..	..	+	..	..	
C. sinostegos v. *obtusius*	..	..	..	+	..	..	
C. siolii	..	..	..	..	..	+	
C. subbengalense	..	..	..	+	..	..	
C. subcucumis	..	..	..	+	..	..	
C. subdanicum	..	..	..	+	..	..	
C. subnordstedtii	..	..	..	..	..	+	
C. subpraemorsum	..	..	..	+	..	+	
C. subspeciosum f. *brasiliense*	..	..	..	..	..	+	
C. subtriordinatum v. *acervatum*	..	..	..	..	..	+	
C. subtumidum v. *circulare*	+	..	..	..	..	..	
C. subtumidum f. *minor*	..	..	..	+	..	..	
C. subtumidum v. *pachydermum*	..	..	..	..	..	+	
C. subtumidum v. *platydesmium*	..	..	..	+	..	..	
C. succisum	..	..	..	+	..	..	
C. tenue f. *tumidum*	..	..	..	..	..	+	
C. tinctum	..	..	..	+	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
C. tinctum v. *subretusum*	..	..	..	..	..	+	
C. tinctum v. *tumidum*	..	..	..	+	..	..	
C. trilobulatum	..	..	..	..	+	..	
C. trilobulatum v. *basichondrum*	..	..	..	+	..	..	
C. variolatum	..	..	..	+	..	..	
C. variolatum v. *cataractarum*	..	..	..	+	..	..	
C. variolatum v. *rotundatum*	..	..	..	..	..	+	
C. variolatum forma	..	..	..	..	+	..	
C. zonatum v. *subcirculare*	..	..	..	..	..	+	
Cosmarium sp.	..	..	+	..	..	..	f. 9 : 13-14
Xanthidium amazonense	..	..	..	..	+	+	
X. armatum v. *circumornatum*	..	..	..	..	..	+	
X. canadense	..	..	..	+	..	+	
X. canadense v. *amazonense*	+	..	..	..	..	+	f. 13 : 7-8, 14 : 10
X. canadense v. *borgei*	..	..	..	..	..	+	
X. canadense v. *magnum*	..	..	..	..	..	+	
X. concinnum v. *boldtianum*	..	..	..	+	..	..	
X. fragile	+	..	+	+	+	+	f. 2 : 5, 6 : 10, 15 : 1-6
X. mamillosum	..	+	..	+	..	..	f. 16 : 13
X. mamillosum v. *borgei*	..	..	..	+	..	+	
X. mamillosum f. *longispina*	..	..	..	+	..	..	
X. mamillosum f. *mediolaeve*	..	+	..	+	..	..	f. 2 : 3
X. mamillosum f. *multispinum*	..	..	+	..	..	..	
X. mamillosum v. *pseudotropicum*	..	..	..	+	..	+	
X. mamillosum v. *sexaculeatum*	..	..	..	+	..	+	
X. multispinosum	..	..	..	..	+	..	
X. nordstedtii	+	+	..	+	+	+	f. 16 : 11-12
X. obsoletum v. *brasiliensis*	..	..	..	+	..	..	
X. paraguayense	..	+	..	+	..	..	f. 11 : 5, 12 : 12-13
X. pseudoregulare	..	..	..	+	..	+	
X. pseudoregulare v. *hexagonum*	+	..	+	..	..	+	f. 2 : 4
X. sexangulare	..	..	..	+	..	+	
X. siolii	..	..	..	..	+	+	
X. tenuissimum	..	..	..	+	..	..	syn. : *Arthrodesmus tenuissimus*
X. trilobum	+	+	..	+	..	+	f. 1 : 8, 16 : 14-15
Ichthyocercus longispinus v. *amazonensis*	..	..	..	..	..	+	
Arthrodesmus borgei	..	..	..	..	+	..	
A. longispinus	..	+	..	+	..	..	f. 2 : 6-7, cf. Grönblad (1945, f. 153, 177)
A. mucronulatus	..	..	..	+	..	..	
A. octocornis	+	..	..	..	..	..	
Staurodesmus apariens	..	..	..	..	+	..	
S. apariens v. *latior*	..	..	..	..	+	..	
S. bulnheimii forma	..	..	..	+	..	..	
S. calyxoides	..	..	..	..	..	+	
S. calyxoides v. *marthae*	..	..	..	+	+	+	
S. clepsydra	..	..	..	..	..	+	
S. clepsydra f. *obtusa*	..	+	..	+	..	+	f. 1 : 9
S. connatus	..	..	..	..	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
S. convergens	..	+	..	+	..	..	Grönblad (1945, f. 168)
S. convergens v. *laportei*	..	..	..	+	..	+	
S. convergens v. *pumilus*	..	..	..	+	..	..	
S. convergens v. *wollei*	..	..	..	+	..	..	
S. corniculatus	..	..	..	..	+	..	
S. cornutus	..	..	..	+	..	+	
S. curvatus v. *borgei*	..	..	..	..	..	+	
S. cuspidatus	..	+	..	+	+	+	also the forma in Grönblad (1945, f. 165)
S. cuspidatus v. *curvatus*	..	..	..	..	..	+	
S. cuspidatus v. *curvatus* forma	..	..	..	..	+	..	
S. cuspidatus v. *groenbladii*	..	..	..	..	?	+	
S. cuspidatus v. *subexcavatus*	..	..	..	..	..	+	
S. dejectus	..	..	..	..	..	+	
S. dejectus v. *borealis* f. *amazonensis*	..	..	..	..	..	+	
S. dickiei	..	..	..	+	..	..	
S. dickiei v. *circularis*	..	..	..	+	..	..	
S. dickiei v. *denticulatus*	..	..	..	+	+	..	
S. dickiei v. *maximus*	..	..	..	+	..	+	
S. dickiei v. *rhomboideus*	..	..	..	..	..	+	
S. extensus	..	..	..	+	..	+	
S. glaber	..	..	..	..	+	..	
S. glaber v. *debaryanus*	..	..	..	+	..	..	
S. glaber v. *flexispinus*	..	..	..	..	+	..	
S. hirundinella	..	..	..	..	..	+	
S. jaculiferus	..	..	..	+	..	..	
S. jaculiferus v. *stroemii*	..	..	..	..	+	..	
S. lobatus	..	..	..	+	..	+	
S. lobatus v. *ellipticus*	..	+	..	+	..	+	
S. lobatus v. *minor*	..	+	..	+	..	..	l. 46.5 μ
S. mamillatus	+	+	+	+	+	+	Grönblad (1945, f. 227)
S. maximus	..	..	..	+	..	..	
S. maximus forma	..	..	..	..	..	+	
S. maximus f. *angulosus*	..	..	..	+	..	..	
S. maximus v. *groenbladii*	..	..	..	+	..	..	
S. megacanthus v. *scoticus*	..	..	..	..	..	+	
S. megacanthus v. *triangularis*	..	+	..	+	..	+	f. 1 : 12, 16 : 10
S. mucronatus	..	..	..	+	..	+	
S. mucronatus v. *groenbladii*	..	..	..	+	..	..	
S. mucronatus v. *subtriangularis*	..	..	..	+	..	..	
S. o'mearii	..	..	..	+	..	..	
S. o'mearii v. *infractus*	..	..	..	..	..	+	
S. pachyrhynchus v. *pseudopachyrynchus*	..	..	..	+	..	..	
S. patens	..	..	..	+	+	+	
S. phimus	..	..	..	+	..	..	
S. prainii v. *pullulus*	..	..	..	+	..	..	
S. pseudoarthrodesmus	+	+	..	+	+	+	f. 1 : 13, incl. v. *bifidus*
S. psilosporus v. *retusus*	..	..	..	+	..	..	
S. quiriferus v. *evolutus*	..	..	+	..	..	..	f. 16 : 8, l. 16 (32) μ, b. 48 μ

	Jurucui	Maicá	Eva	Grönblad	S.G.C.	Förster	
S. selenaeus	..	..	..	+	..	..	
S. spencerianus	..	+	..	+	+	+	f. 1 : 10-11, 16 : 9
S. spencerianus v. *cruciatus*	+	..	..	+	..	..	f. 10 : 14, l. 12 μ without processes
S. subulatus	..	..	..	..	..	+	
S. subulatus f. *nordstedtii*	+	+	..	+	+	+	f. 16 : 5
S. subunguiferus v. *bourrellyi*	..	..	..	..	..	+	
S. subunguiferus v. *flexus*	..	..	..	..	..	+	
S. triangularis	..	..	+	+	..	+	Teiling (1948, f. 64)
S. triangularis v. *inflatus*	..	..	..	..	..	+	
S. triangularis v. *limneticus*	+	..	..	..	..	..	f. 16 : 6-7, l. 28-30 μ, b. 96-100 μ
S. triangularis v. *subparallelus*	+	..	..	..	..	+	
S. unguiferus v. *brasiliensis*	..	..	..	+	..	..	
S. validus	+	..	..	+	..	..	f. 16 : 1-4
S. validus v. *subvalidus*	..	..	+	+	..	+	Grönblad (1945, f. 183)
S. validus v. *subvalidus* f. *gibbosus*	..	..	..	..	..	+	
S. validus forma	..	..	..	+	..	+	
S. wandae v. *pseudopterosporus*	..	..	..	..	..	+	
Staurastrum ambiguum	..	..	..	..	..	+	
S. americanum	..	+	..	+	..	..	Grönblad (1945, f. 188)
S. arachne v. *curvatum*	..	..	..	+	..	+	
S. arctiscon v. *glabrum*	..	+	+	..	+	..	
S. asterias	..	+	..	..	..	..	7-radiate
S. asteroideum	..	..	..	+	..	..	
S. asteroideum v. *nanum*	..	..	..	..	..	+	
S. aureolatum v. *ayayense*	..	..	..	+	..	..	
S. bacillare	..	..	..	+	..	..	
S. bineanum v. *brasiliense*	..	..	..	+	..	..	
S. binum v. *inaequale*	..	..	..	..	+	..	
S. boergesenii	+	..	..	..	..	..	f. 13 : 10, 19 : 12-14
S. boergesenii v. *aculeatum*	..	..	..	..	..	+	
S. boergesenii v. *depauperatum*	..	+	..	..	+	+	f. 1 : 14-15, 19 : 15
S. boergesenii v. *elegans*	..	+	+	+	+	+	
S. boergesenii v. *glabrum*	..	..	..	..	..	+	
S. boergesenii v. *gracilescens*	..	..	..	..	..	+	
S. boergesenii v. *simplicior*	+	+	..	..	..	..	f. 1 : 17
S. boergesenii v. *scottii*	..	..	..	..	+	+	
S. boergesenii v. *trifidum*	..	+	..	+	..	..	
S. botanense	..	..	..	+	..	..	
S. brachiatum	..	+	..	+	+	+	
S. brachioprominens f. *minor*	..	+	..	..	..	..	f. 18 : 4, l. 18 (32) μ
S. brasiliense	+	+	+	+	+	+	f. 4 : 2-3, 13 : 9, 14 : 9
S. brasiliense v. *porrectum*	..	..	..	+	..	+	f. 4 : 1, 8 : 4
S. brasiliense forma	..	..	+	..	..	..	
S. brebissonii v. *brasiliense*	+	+	..	+	..	+	f. 18 : 18-19, l. 54.4 (64) μ, b. 48 (64) μ
S. brebissonii v. *curvispinum*	..	..	..	+	..	..	
S. bullardii v. *brasiliense*	..	..	..	..	..	+	
S. bullardii v. *glabrum*	..	..	..	..	..	+	
S. capitulum	+	..	..	..	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
S. capitulum forma	..	..	..	..	+	..	
S. ceratophorum	..	..	..	+	..	+	
S. ceratophorum v. *duplicatum*	..	..	..	+	..	..	
S. cingulum	..	+	..	..	..	..	f. 18 : 21
S. circulus forma	+	..	..	+	..	..	f. 17 : 7, 19 : 3-5, l. 36-40 (76-80) μ
S. coarctatum	..	..	..	+	..	..	
S. columbetoides v. *basiaculeatum*	..	..	..	..	+	..	
S. columbetoides v. *ginzbergeri*	+	+	+	+	..	+	f. 3 : 14
S. columbetoides v. *quadridentatum*	..	..	..	..	..	+	
S. coronulatum v. *minus*	..	..	..	..	..	+	
S. cosmarioides	..	..	..	..	+	+	
S. cosmarioides v. *callosum*	..	..	..	..	..	+	
S. cosmarioides f. *elevatum*	..	..	..	..	+	..	
S. cyrtocerum	..	..	..	+	..	..	
S. dentatum v. *gracile*	..	..	..	..	..	+	
S. diptilum	..	..	..	+	..	+	
S. dispergens	..	..	..	+	..	..	
S. disputatum v. *sinense*	..	..	..	+	..	..	
S. distentum	..	..	..	+	..	..	
S. elegantissimum v. *brasiliense*	..	..	..	..	..	+	
S. elegantissimum f. *brasiliense* f. *triradiatum*	..	..	..	..	..	+	
S. ellipticum	..	..	..	+	..	..	
S. elongatum v. *amazonense*	+	..	..	..	+	+	f. 18 : 5, l. 40 μ
S. erasum	..	..	..	+	..	..	
S. erinacoideum	..	..	..	..	+	+	
S. excavatum	..	..	..	+	..	..	
S. flagriforme	..	..	..	..	..	+	
S. galpinii	..	..	..	..	..	+	
S. glabribrachiatum	..	+	..	..	..	+	f. 3 : 5, 17 : 3
S. glaphyrum	..	..	..	..	?	..	
S. gracile	..	..	..	+	..	..	
S. gracile v. *curtum*	..	..	..	+	..	..	
S. grande v. *parvum*	..	..	..	+	..	..	
S. guentheri	..	+	..	..	..	+	
S. hagmannii	..	..	..	+	..	..	
S. hirtum.	..	..	..	..	..	+	
S. hoehnei	..	..	..	+	..	..	
S. humerosum v. *gracile*	..	..	..	..	..	+	
S. hystrix	..	..	..	..	+	..	
S. hystrix v. *brasiliense*	..	..	..	+	+	..	
S. hystrix v. *brasiliense* forma	..	..	..	..	..	+	
S. hystrix forma	..	..	..	..	+	..	
S. inaequale v. *triceps*	..	..	..	+	..	..	
S. inconspicuum	..	..	..	+	..	..	
S. invocator	..	..	..	..	..	+	
S. iotanum	..	..	..	+	..	+	
S. irregulare	..	..	..	..	..	+	
S. irregulare v. *subosceolense*	..	..	..	+	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
S. johnsonii v. *amazonense*	..	..	..	..	..	+	
S. johnsonii v. *triradiatum*	..	..	..	+	..	..	
S. jurucuiense	+	+	..	..	..	..	f. 5 : 7-8, 10 : 11, 17 : 15
S. laeve	..	..	..	+	..	..	
S. laevispinum	..	..	..	+	..	..	
S. laevispinum v. *compactum*	..	..	..	+	..	..	
S. laevispinum forma	..	..	..	..	+	..	
S. lepidum v. *latecurvatum*	..	..	+	+	+	..	frequent
S. leptacanthum	+	+	..	+	..	..	f. 19 : 6
S. leptacanthum f. *amazonense*	..	..	..	..	..	+	
S. leptacanthum v. *borgei*	..	..	..	..	+	..	
S. leptacanthum v. *borgei* forma	..	..	..	..	..	+	
S. leptocladum v. *africanum* forma	..	+	..	+	+	..	f. 3 : 4, 18 : 1
S. leptocladum v. *cornutum*	+	+	..	+	..	..	
S. leptocladum v. *cornutum* f. *crassius*	..	..	..	..	..	+	
S. leptocladum v. *denticulatum*	+	..	..	+	..	..	f. 18 : 2, l. 40 (88) μ, b. 136 μ
S. leptocladum v. *inerme*	..	..	..	..	..	+	
S. leptocladum v. *insigne*	..	+	..	+	+	..	f. 18 : 3
S. leptocladum v. *insigne* forma	..	..	..	..	..	+	
S. leptocladum v. *parispinuliferum*	..	..	..	..	..	+	
S. leptocladum v. *smithii*	..	..	..	+	+	..	
S. limneticum v. *burmense*	..	..	..	+	..	..	
S. logimum v. *spiniferum*	+	..	..	..	..	..	
S. longibrachiatum v. *kriegeri*	..	..	..	+	..	..	
S. longipes	..	..	..	+	+	..	
S. longipes forma	..	..	..	..	..	+	
S. luetkemuelleri	..	..	..	..	+	..	
S. mammangulare	..	..	..	+	..	..	
S. manfeldtii	..	+	..	..	..	..	l. 28 μ, b. 52 μ
S. manfeldtii v. *annulatum*	..	..	..	+	..	..	
S. margaritaceum forma	..	..	..	+	..	..	Borge (1925, f. 1 : 7)
S. margaritaceum forma	..	..	..	..	+	..	
S. micron	..	..	..	+	..	..	
S. minnesotense	+	+	..	+	..	..	
S. mutabile	..	+	..	+	..	..	l. 55 μ, Grönblad (1945, f. 236)
S. muticum	..	..	..	..	..	+	
S. muticum v. *depressum*	..	..	..	+	..	..	
S. muticum v. *polygonum*	..	..	..	+	..	..	
S. muticum forma	..	..	..	+	..	..	Borge (1918, f. 4 : 7)
S. noduliferum	..	..	..	+	..	..	
S. nodulosum forma	..	+	..	..	..	..	f. 18 : 17
S. novae-caesareae v. *brasiliense*	+	+	+	+	..	+	f. 19 : 7-11
S. nudibrachiatum	+	+	..	+	..	..	Grönblad (1945, f. 239)
S. octodontum v. *longibrachiatum*	+	..	+	..	..	..	f. 3 : 13, 6 : 11
S. ophiura v. *perornatum*	..	+	..	+	..	..	
S. orbiculare	..	..	..	+	..	..	
S. orbiculare v. *depressum*	..	..	..	+	+	..	
S. orbiculare v. *depressum* forma	..	..	..	..	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
S. orbiculare v. *hibernicum*	..	..	..	+	..	..	
S. oxyacantha v. *maius* forma	+	+	..	..	..	..	f. 17 : 1
S. paradoxum	..	..	..	+	..	..	
S. paradoxum v. *parvum*	..	..	..	+	..	..	
S. penicilliferum	+	+	..	+	..	+	f. 1 : 16, 10 : 4-5
S. penicilliferum v. *simplex*	..	..	..	+	..	..	
S. penicilliferum forma	..	..	..	..	+	..	
S. perundulatum	..	..	..	..	..	+	
S. pingue	..	..	+	..	..	..	
S. pinnatum v. *reductum*	..	..	..	..	..	+	
S. planctonicum	..	+	..	..	..	..	
S. polymorphum v. *divergens*	..	..	..	..	..	+	
S. polymorphum forma	..	..	..	..	+	..	
S. protractum	..	..	..	+	..	..	
S. protractum forma	..	..	..	..	+	..	
S. pseudoassurgens	..	..	..	..	?	..	
S. pseudobacillare	..	..	..	+	..	..	
S. pseudomuricatum	..	..	..	+	..	..	
S. pseudoquadrangulare	..	..	+	..	..	..	f. 3 : 8-10
S. pseudosebaldi	..	..	..	+	..	+	
S. pseudosebaldi v. *elongatum*	..	+	..	..	..	..	f. 19 : 6, l. 48 μ, b. 72 μ
S. pseudosebaldi v. *planctonicum*	..	..	..	..	..	+	
S. pseudosebaldi v. *unguiculatum*	..	..	..	+	..	..	
S. pseudotetracerum v. *curvatum*	..	..	..	..	..	+	
S. pseudozonatum v. *minutissimum*	..	..	..	..	+	+	
S. pseudozonatum forma	..	..	..	..	+	..	
S. quadrangulare	..	..	..	+	..	..	
S. quadrangulare v. *contectum*	..	..	..	+	+	+	
S. quadrangulare v. *longispinum*	..	..	..	+	..	+	
S. quadrangulare v. *prolificum*	..	..	..	..	+	+	
S. quadrangulare v. *setigerum*	..	..	..	+	..	+	
S. quadricornutum	..	..	..	+	..	..	
S. quadrinotatum	..	..	..	+	+	+	
S. quadrinotatum v. *constrictum*	..	..	..	..	+	..	
S. quadrinotatum v. *constrictum* forma	..	..	..	..	+	..	
S. quadrinotatum v. *octospinulosum*	..	..	..	..	..	+	
S. quadrinotatum forma	..	..	+	..	..	..	f. 3 : 11
S. radians v. *brasiliense*	..	..	..	..	+	+	
S. rectangulare forma	+	..	..	..	..	..	f. 17 : 2, l. 48 μ, b. 32 μ
S. rotula	+	+	+	+	+	+	
S. royii	..	..	..	+	+	+	
S. saltans v. *brasiliense*	+	+	..	+	..	+	f. 19 : 1-2, l. 48-52 μ, b. 124 μ
S. sebaldi v. *brasiliense*	..	..	..	+	..	..	
S. sebaldi v. *ornatum*	+	+	..	..	..	+	f. 3 : 7
S. sebaldi v. *raciborskii*	..	..	..	+	..	..	
S. setigerum	..	..	..	+	..	..	
S. setigerum v. *longirostre*	+	+	..	+	..	..	
S. setigerum v. *occidentale*	..	..	..	+	..	+	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
S. setigerum v. *pectinatum*	..	..	..	+	..	+	
S. setigerum v. *reductum*	..	+	..	+	..	..	
S. setigerum v. *spinellosum*	..	..	..	..	..	+	
S. setigerum v. *subvillosum*	+	+	+	+	..	+	
S. setigerum v. *tristichum* f. *furcatum*	..	..	..	..	..	+	
S. sexangulare v. *brasiliense*	..	+	..	+	..	+	
S. sinuatum	..	..	..	+	..	..	
S. siolii	..	..	..	..	+	..	
S. siolii f. *divergens*	..	+	..	..	..	..	f. 3 : 15, 19 : 20
S. spiculiferum	..	..	..	+	+	..	
S. spiculiferum f. *minor*	..	+	..	..	..	..	f. 17 : 9
S. spiculiferum f. *reductum*	..	..	..	..	+	..	
S. stelliferum	+	+	+	+	+	+	f. 18 : 6
S. stelliferum v. *evolutum*	+	..	..	..	+	+	f. 17 : 6, 18 : 13-15
S. striolatum	..	..	..	+	..	..	
S. subamericanum	..	..	..	+	..	..	
S. subanchora forma	+	+	..	+	..	..	f. 3 : 6, 8 : 1-3, 17 : 2
S. subgrande v. *aversum*	..	..	..	+	..	..	
S. subindentatum v. *brasiliense* f. *sexspinulosum*	+	+	..	..	..	..	f. 18 : 11-12, l. 28-33 (53) μ
S. subindentatum v. *lepidiforme*	+	..	..	..	+	+	f. 17 : 4, b. 88 μ
S. submanfeldtii v. *convergens* forma	..	+	..	+	..	..	f. 18 : 9-10
S. submeriani	..	..	..	..	..	+	
S. subnudibrachiatum	..	..	..	+	..	..	
S. subophiura	..	..	..	..	..	+	
S. subscabrum v. *scabrius*	..	..	..	+	..	..	
S. subzoniferum	..	..	..	..	..	+	
S. taperinhae	..	+	..	+	..	..	
S. tectum	+	+	..	..	..	..	f. 18 : 6
S. tectum v. *ayayense*	..	+	+	+	..	+	f. 3 : 12, 18 : 7, l. 35 μ without processes
S. teliferum v. *groenbladii*	+	..	..	..	..	..	f. 17 : 10, l. 32 (44) μ
S. teliferum v. *lagoense*	..	..	..	+	..	..	
S. teliferum v. *longispinum*	..	..	..	+	..	+	
S. teliferum v. *ordinatum*	..	..	..	..	+	..	
S. teliferum v. *pecten*	..	+	..	+	..	..	
S. tentaculiferum	+	..	..	..	..	..	f. 17 : 11
S. tetracerum	+	..	..	+	..	..	2 and 3-radiate
S. thienemannii forma	..	..	+	..	..	..	f. 17 : 8, l. 14 (36) μ, b. 58 μ
S. tohopekaligense	..	..	..	+	..	..	
S. tridens-neptuni v. *scottii*	..	..	..	..	+	+	
S. trifidum v. *inflexum*	..	..	..	..	..	+	
S. trifidum v. *porrectum*	..	..	..	..	+	..	
S. trifidum v. *tortum*	..	..	..	+	..	..	
S. triforcipatum	..	..	..	+	..	..	
S. trihedrale	+	..	..	..	+	..	
S. triundulatum v. *brasiliense*	+	..	..	+	+	..	f. 18 : 8
S. tryssos	..	..	..	..	+	+	
S. urinator	..	..	..	+	..	..	
S. urinator v. *brasiliense*	..	..	..	+	..	+	cf. Borge (1896, f. 22)

	Juruena	Maica	Eva	Grönblad	S.G.C.	Förster	
S. vestitum	..	..	..	+	..	..	
S. vestitum v. *subanatinum*	..	+	..	..	+	+	f. 3 : 1-3, 19 : 17-19
S. willsii	..	..	..	+	..	..	
S. wolleanum	..	..	..	..	+	+	
S. wolleanum v. *brasiliense*	..	+	..	..	+	..	f. 18 : 20
S. wolleanum v. *brasiliense* forma	..	..	..	..	+	..	
S. wolleanum v. *kissimense*	..	..	..	+	..	..	
S. xiphophorum	..	..	..	+	..	..	
S. zonatum	+	..	..	+	..	+	
S. zonatum f. *elongata*	..	..	..	+	..	..	
Amscottia mira	..	..	..	..	+	..	
Spondylosium desmidiiforme	..	..	+	..	+	..	
S. desmidiiforme f. *tenuius*	..	..	..	..	+	..	
S. javanicum	..	..	..	+	..	..	
S. javanicum v. *convergens*	..	..	..	+	..	..	
S. moniliforme	..	..	..	+	+	..	
S. moniliforme v. *reniforme*	..	..	..	+	+	+	
S. panduriforme f. *limneticum*	+	+	..	+	..	+	
S. planum	..	..	..	+	..	+	
S. pulchellum v. *austriacum*	..	..	..	+	..	..	
S. pulchrum	+	+	..	..	+	..	
S. pulchrum v. *brasiliense*	..	..	..	+	..	..	
S. rectangulare	..	..	..	+	+	..	
S. rectangulare f. *maius*	..	..	..	..	+	+	
S. secedens	..	..	..	+	..	..	
S. tetragonum	..	..	..	+	..	..	
Sphaerozosma filiforme	..	+	..	+	..	..	sinus open
S. laeve	+	+	..	+	+	..	
S. laeve v. *hians*	..	..	..	+	+	+	
S. laeve v. *latum*	..	..	..	..	..	+	
S. laeve v. *macracanthum*	..	..	..	+	+	+	
S. laeve v. *microspina*	..	+	..	..	..	..	
S. laeve v. *rectangulare*	..	..	..	+	..	..	
S. laeve v. *subrectangulare*	..	..	..	+	..	..	
S. laeve v. *uncinatum*	..	..	..	+	..	+	
S. laeve forma	..	+	..	..	..	..	f. 12 : 18-19
S. vertebratum	..	..	..	+	..	..	
Teilingia excavatum	..	..	..	+	..	..	
T. granulatum	..	..	..	+	..	+	
T. wallichii	+	..	..	..	..	..	f. 11 : 14
T. wallichii v. *borgei*	..	+	..	+	+	+	l. 21.6 μ
Desmidium aëquale	..	..	..	+	..	..	
D. aptogonum	..	..	..	+	..	..	
D. aptogonum v. *acutius*	..	..	..	..	..	+	
D. baileyi	..	..	..	+	+	..	
D. baileyi f. *tetragonum*	+	..	+	..	+	+	
D. bengalicum	..	..	..	..	..	+	
D. bicristatosporum	..	..	..	+	..	..	

	Jurucui	Maica	Eva	Grönblad	S.G.C.	Förster	
D. coarctatum	+	..	+	+	+	..	
D. curvatum	+	..	..	..	+	+	f. 11 : 15-16
D. cylindricum	..	..	..	..	..	+	
D. cylindricum v. *obliquum*	+	..	..	..	..	..	f. 12 : 16
D. elegans	+	..	..	+	+	+	
D. elegans forma	+	..	..	..	..	..	f. 11 : 17, 12 : 17, l. 38 μ, b. 28 μ
D. graciliceps	..	..	..	+	+	+	
D. graciliceps v. *gracilius*	..	..	..	+	+	+	
D. graciliceps f. *maior*	..	..	..	+	..	..	
D. graciliceps forma	..	..	..	+	..	..	
D. grevillii	+	..	..	+	+	..	b. 44-50 μ
D. grevillii f. *maior*	+	..	..	+	..	+	b. 80 μ
D. grevillii f. *obliquum*	+	..	..	..	..	..	
D. grevillii forma	..	..	..	..	+	..	
D. laticeps	..	..	..	+	..	+	
D. pseudostreptonema	+	..	..	+	..	..	f. 12 : 15
D. pseudostreptonema f. *trigona*	+	+	..	..	..	..	
D. quadratum	..	..	..	+	+	+	
D. siolii	..	..	..	..	..	+	
D. swartzii	+	..	..	+	..	..	
D. swartzii v. *amblyodon*	..	..	..	+	..	+	
D. swartzii v. *quadrangulatum*	..	..	..	+	..	..	
Bambusina attenuata	+	..	..	..	+	..	
B. borreri	+	..	+	+	+	+	syn. : *B. brebissonii*
B. borreri v. *brasiliense*	..	..	..	..	..	+	
B. borreri v. *maius*	..	..	..	..	+	+	
B. confervacea	..	..	..	+	..	..	
B. delicatissima	..	..	..	+	+	..	
B. longicollis	..	..	..	..	+	..	
Haplozyga armata	..	..	..	..	+	..	
Phymatodocis alternans	..	..	..	+	..	..	
P. irregularis	+	..	..	+	..	+	
P. nordstedtiana	..	..	..	+	..	+	
P. nordstedtiana f. *minor*	+	..	..	..	..	..	f. 12 : 14
Hyalotheca dissiliens	..	..	..	+	+	+	
H. dissiliens v. *hians*	..	..	..	+	..	..	
H. dissiliens v. *tatrica*	..	..	..	+	..	..	
H. dissiliens v. *tridentula*	..	..	..	..	+	..	
H. indica v. *javanica*	..	..	..	+	..	+	
H. indica v. *javanica* f. *maior*	..	..	..	..	+	+	
H. mucosa	..	+	..	+	..	+	
H. mucosa v. *laevicincta*	..	..	..	+	..	..	
H. undulata	+	..	..	+	+	+	
Groenbladia inflata	..	..	..	..	..	+	
G. neglecta	..	..	..	+	+	..	
G. neglecta v. *elongata*	..	..	..	..	+	+	
G. neglecta v. *tenuis*	..	..	..	..	..	+	
G. neglecta forma	..	..	..	..	+	..	

	Jurucui	Maica	Eva	Gillard	Hauer	
ROTATORIA						
Anuraeopsis fissa	+	..	+	+	..	
Ascomorpha ecaudis	..	..	..	..	+	
A. ovalis	..	+	+	..	..	
Ascomorpha sp.	..	..	..	..	+	
Asplanchna girodi	..	..	..	..	+	
A. sieboldi	..	+	..	..	+	
Brachionus budapestinensis	..	..	..	..	+	
B. calyciflorus	..	..	+	..	..	
B. calyciflorus dorcas spinosa	..	..	..	..	+	
B. calyciflorus mucronatus	..	..	..	..	+	
B. caudatus insuetus	..	..	..	..	+	
B. caudatus personatus	..	..	..	..	+	
B. dolabratus	..	..	..	..	+	
B. falcatus	..	..	..	+	+	Lago Redondo
B. gessneri	+	+	+	+	+	f. 24 : 8, l. 140-170 µ
B. havanaensis	..	..	..	..	+	
B. mirabilis	+	..	..	..	..	f. 20 : 1-3
B. patulus	..	..	..	+	+	
B. patulus macracanthus	..	..	..	..	+	
B. quadridentatus	+	..	..	..	..	
B. quadridentatus melheni	..	..	..	..	+	
B. voigti	..	..	..	..	+	
B. zahniseri reductus	+	+	..	..	+	f. 20 : 4-5, l. 244-245 µ
Cephalodella mucronata	+	..	..	+	..	f. 20 : 7
Chromogaster klementi	..	..	..	..	+	
Chromogaster sp.	..	..	..	..	+	
Colurella bicuspidata	..	..	..	..	+	
C. obtusa	..	..	..	..	+	
C. uncinata	..	..	..	+	+	
Conochiloides coenobasis	+	..	+	..	..	
C. dossuarius	..	..	+	..	..	
Conochilus spp.	..	..	..	+	+	Lago Jari
Dipeuchlanis macrodactyla	..	..	..	..	+	
D. propatula	+	..	..	..	..	f. 20 : 8, 22 : 10, l. 153 µ, b. 126 µ
Dipeuchlanis sp.	+	..	..	..	..	f. 23 : 2-3
Dissotrocha aculeata	..	+	..	..	..	
D. aculeata medioaculeata	..	+	..	..	..	f. 4 : 7, 23 : 7-8
D. macrostyla	..	..	..	..	+	
D. schlienzi	+	..	..	..	..	f. 24 : 9-10
Epiphanes macroura	..	..	..	..	+	
Euchlanis dilatata	..	+	..	..	+	
E. incisa	..	..	..	..	+	
E. parva	..	+	..	..	+	l. 176 µ
Eudactylota wulferti	..	..	..	..	+	
Filina longiseta	..	+	..	..	+	
F. longiseta saltator	..	..	..	..	+	
F. terminalis	..	..	..	+	..	

	Juruçui	Maica	Eva	Gillard	Hauer	
Filina sp.	..	..	..	..	+	
Gastropus stylifer	..	..	..	..	+	
Hexarthra intermedia brasiliensis	..	..	..	+	+	
H. mira	..	+	..	..	..	Lago Redondo
Hexarthra spp.	..	..	+	+	+	
Itura claviger	..	..	..	..	+	
Keratella americana	+	+	+	+	+	f. 20 : 6
K. cochlearis	+	..	+	+	+	
K. lenzi	..	..	..	..	+	
K. tropica	..	+	..	..	+	
Lacinularis sp.	..	..	..	..	+	
Lecane acus	..	..	..	..	+	
L. arcula	..	..	..	..	+	
L. armata	+	..	..	..	..	f. 24 : 6-7
L. bulla	+	+	..	..	+	
L. closterocerca	..	..	..	+	+	
L. cornuta	..	+	..	+	+	f. 21 : 8
L. crenata	..	+	..	+	+	
L. crepida	..	..	..	?	+	
L. curvicornis	..	+	..	..	+	f. 20 : 11, 21 : 6
L. curvicornis nitida	+	+	..	..	..	f. 22 : 1
L. elsa	..	..	..	..	+	
L. furcata	..	..	..	..	+	
L. hamata	..	+	..	..	+	
L. holiclysta	..	..	..	..	+	
L. inermis	..	..	..	..	+	
L. inopinata	..	..	..	..	+	
L. lauterborni	+	..	..	..	..	f. 21 : 7
L. leontina	..	+	..	..	+	f. 4 : 8, 23 : 5
L. ludwigi	..	..	..	..	+	
L. luna	..	..	..	+	..	
L. lunaris	..	..	..	+	+	
L. marlieri	..	..	..	+	..	
L. melini	+	+	..	..	+	f. 20 : 9-10, 22 : 5
L. methoria	..	+	..	..	..	f. 21 : 9
L. murrayi	+	..	..	..	+	f. 24 : 5, l. 112 µ, toe 44 µ
L. ohioensis	..	..	..	..	+	
L. papuana	..	..	..	..	+	
L. pertica	+	..	..	+	..	f. 21 : 3-4
L. ploenensis	+	..	..	..	+	f. 21 : 1-2
L. proiecta	+	+	..	+	+	f. 5 : 2, 22 : 3-4, frequent
L. quadridentata	..	..	..	..	+	
L. remanei	+	..	..	..	+	f. 22 : 2, 23 : 1
L. rhytida	..	..	..	..	+	
L. rudescui	..	..	..	..	+	
L. saginata	+	..	..	..	..	f. 21 : 5
L. sibina	+	..	..	..	..	l. 104 µ
L. tabida	..	..	..	..	+	

	Jurucui	Maica	Eva	Gillard	Hauer	
L. ungulata	..	..	..	..	+	
Lecane spp.	..	..	..	+	+	
Lepadella cristata	+	+	..	+	..	
L. imbricata	..	..	..	..	+	
L. ovalis	..	..	..	..	+	
L. patella	..	..	..	..	+	
L. rhomboides carinata	..	..	..	..	+	
L. rottenburgi	..	..	..	..	+	
L. triptera	+	..	..	..	..	
Lepadella sp.	..	..	..	+	..	
Macrochaetus collinsi	..	..	..	+	+	
M. multispinosus	+	..	..	+	..	
M. sericus	..	..	..	+	..	
Monommata sp.	..	..	+	..	..	
Mytilina ventralis	..	..	..	..	+	
Platyias quadricornis	..	+	..	..	+	
Ploesoma lenticulare	..	..	..	..	+	
P. truncatum	+	..	+	+	+	
Ploesoma sp.	..	..	..	..	+	
Polyarthra dolichoptera	..	..	..	..	?	
P. longiremis	..	..	..	..	+	
P. cf. *maior*	..	..	..	+	..	
P. vulgaris	..	+	..	+	+	Lago Redondo
Polyarthra spp.	..	+	..	..	+	
Ptygura socialis	..	..	..	?	..	
Ptygura spp.	..	+	..	+	+	f. 24 : 11
Rotaria neptunia	..	..	..	..	+	
Rotaria sp.	..	..	..	..	+	
Sinantherina spinosa	..	+	..	..	+	f. 23 : 6
Synchaeta longipes	..	..	..	..	+	
S. pectinata	..	..	..	..	+	
Synchaeta spp.	..	+	..	+	+	
Testudinella ahlstromi	+	+	..	..	..	f. 4 : 10, 24 : 1
T. amphora	..	+	..	..	..	f. 24 : 3
T. haueriensis	..	+	..	+	..	f. 4 : 11, 24 : 2
T. mucronata	..	..	..	..	+	
T. patina	..	..	..	+	+	
T. semiparva	+	..	..	..	..	f. 24 : 4
T. tridentata amazonica	+	..	..	..	..	f. 22 : 9
Tetramastix opoliensis	..	..	..	+	..	Lago Redondo
Trichocerca bicristata	..	..	..	..	+	
T. birostris	..	..	+	..	..	l. 285-320 μ
T. braziliensis	..	..	..	..	+	
T. capucina	..	..	+	..	+	
T. chattoni	..	..	..	..	+	
T. collaris	..	..	..	..	+	
T. inermis	+	..	..	..	..	l. 88 μ, toe 38 μ
T. mucosa	..	..	..	..	+	

	Jurucui	Maica	Eva	Gillard	Haufr	
T. myersi	+	..	..	..	..	
T. porcellus	+	..	..	..	..	
T. pusilla	..	..	..	..	+	
T. ruttneri	..	..	..	..	+	
T. similis	..	..	+	..	+	
T. similis grandis	..	..	..	..	+	
T. stylata	..	..	..	..	+	
Trichocerca spp.	..	..	+	+	+	
Trichotria tetractis	..	+	..	..	+	f. 20 : 12
Trichotria sp.	..	..	..	..	+	
Tripeuchlanis plicata	..	+	..	..	..	

If the organisms reported from peripheral areas of Amazon basin had been included in the table, together with all the records of diatoms, it would have been much larger. However, the purpose was not to produce a complete inventory but merely to give some idea of the character of life in Amazon waters. In spite of the many shortcomings and sources of error it might be of interest to compare the Amazon with another river which has been the subject of many investigations, the Danube.

	Amazon.	Danube.
Length	5 340 km	2 850 km
Drainage area	7 050 000 km²	817 000 km²
Number of taxa :		
Chlorococcaceae	71	290 (Szemes, 1967)
Desmidiaceae	960	176 (Szemes, 1967)
Rotiferae	150	200 (Dudlich, 1967)

There is a marked difference between the two basins in the abundance of *Chlorophyta* : the Amazon is characterized by an abundance of *Desmidiaceae*, and the Danube by the numbers of *Chlorococcaceae*. This reflects the entirely different limnographical character of the water. The water in the Amazon basin has on the whole lower pH, lower electrical conductivity, lower calcium content, lower phosphate content etc. than that of the Danube basin. A comparison of the few available primary productivity records from the Amazon basin (Hammer, 1965 and Marlier, 1965 and 1967) with those from the Danube (Knöpp, 1966) reveals a well marked difference, since the productivity of the Amazon is about the magnitude typical of oligotrophic waters. However, sometimes the plankton in Amazon waters is fairly abundant quantitatively as well as qualitatively. Even then desmids are often predominant, see Braun (1952, p. 92). This abundance of plankton is at variance with the chemical character of the water as reported from many tropical and subtropical lakes, but it has been explained by the rapid turnover of nutrients in the warm environment, see e.g. Braun (1952, p. 121 ff.), Ruttner (1932, p. 144 ff. and 1952, p. 252 ff.), Thienemann (1932), and Thomasson (1959, p. 63).

From a biogeographical point of view, the basic difference between the drainage areas of the Amazon and the Danube lies in the composition of the plankton. The Amazon plankton is composed of widely distributed cosmopolitan species plus distinctly tropical ones, whereas in the Danube there are pratically only cosmopolitans. The desmids have been considered in especial detail above, so the difference appears to be most marked among this group. However, the diatoms would also have been excellent indicators. The distribution of most plankters is still insufficiently known to allow detailed biogeographical analyses. As has been pointed out, e.g. by BOURRELLY (1966, p. 10), « La répartition biogéographique des Algues est vraiment encore dans l'enfance. Actuellement l'aire d'extension des espèces correspond à l'aire de distribution des algologues ». There is a great need for complete lists from all parts of the world. In contrast to the prophecy of WESENBERG-LUND (1910, pp. 399-400), our ideas of species have become still more detailed. The result is that many areas which were considered to be well-known in the early days of phycology now need reconsideration. In addition we need well-documented critical studies from all parts of the world. Without detailed taxonomic foundation, the biogeographical and ecological assumptions are all without a firm basis. In many cases the taxonomic knowledge is there, and we must make use of that important tool. In order to facilitate phycological studies in the Amazon area, for which access to the scattered literature is difficult, the present paper has been provided with a considerable number of figures, and ample taxonomic notes.

TAXONOMICAL COMMENTS

Phacus platalea v. **maior** Poucques.

Figs. 1 : 1, 6 : 13-15, length 116-130 µ, breadth 76-105 µ, Lago Maica.

Compare Kristiansen (1959, fig. 9 : 1), and Friedrich (1964, fig. 3). This plant and the closely related *P. gigas* Cunha are the largest known species of *Phacus*. Note the characteristic large lens-shaped paramylon body in the posterior part of the cell. In *P. gigas* there is nothing like this but only numerous small and scattered granules of paramylon. However, it should be mentioned that Bourrelly has reported (Bourrelly and Manguin, 1952, p. 178) the rare occurrence of a big spherical paramylon body in *P. gigas*. This suggests that these two *Phacus* taxa are close to each other. For the distribution see Friedrich (1964).

Trachelomonas armata v. **longispina** Playf. em. Defl.

Fig. 1 : 2, length 44-46 (60-62) µ, breadth 28-34 (38-44) µ, Lago Maica.

There is some resemblance to *T. echinata* Cunha, see Cunha (1913, p. 111, fig 10 : 8) and Delflandre (1928, fig 69).

Trachelomonas spinosa Stokes.

Fig. 11 : 18, length 40 µ, breadth 28.5 µ, Lago Jurucui.

With regard to its relationship to *T. bituricensis* Wurtz, see Huber-Pestalozzi (1955, p. 561). Compare also *T. spectabilis* Deflandre (1928, p. 220, figs. 67-68), which has a somewhat more oblong test than *T. spinosa*. However, the original figure of *T. spinosa* by Stokes is rather poor.

Trachelomonas sydneyensis v. **obesa** f. **longispina** Thom. n. f.

Fig. 11 : 19, length 40 µ, breadth 32 µ, Lago Maica.

A typo differt spinibus longioribus.

Among the few *Trachelomonas* specimens observed was one resembling *T. sydneyensis* v. *obesa* Playf. However, in addition to the short spines, it had four long posterior spines which were hyaline, like the short ones. Because of the lack of more material, the taxonomic position of the specimens remains uncertain and I have preliminarily designated it as f. *longispina* of *T. sydneyensis* v. *obesa* Playf.

Glenodinium pernardiforme (Lindem.) Schiller ?

Fig. 5 : 6, length 30 µ, breadth 30 µ, Lago Rio Preto da Eva.

An uncertain identification, compare also *Peridinium inconspicuum* v. *excavatum* (Playf.) Lefévre. More material is needed for final settlement of the taxonomic relations of this plant.

Glenodium sp.

In the plankton of Lago Maica, a specimen was observed which had the shape of *G. polylophum* DADAY, but the cell wall lacked the heavy ornamentation characteristic of that species.

Goniaulax digitale (POUCHET) KOFOID.

Figs. 5 : 5, 7 : 16-17, length 78 µ, breadth 50 µ, Lago Rio Preto da Eva.

Only one specimen was observed. The identification has been made with some hesitation because there are a number of similar marine species, and it is risky to base a determination on a single specimen. It resembles e.g. *G diacantha* (MEUNIER) SCHILLER, for example, which is a cosmopolitan marine plankter. Marine dinoflagellates have been found occasionally, but not often, in South American freshwater samples, see e.g. THOMASSON (1963, p. 99).

Goniaulax polygramma STEIN ?

Fig. 17 : 19, length 60 µ, breadth 40 µ, Lago Maica.

This identification is also made with great hesitation, and may be wrong. Further investigations of the taxonomic relations of this plant are needed. *G. polygramma* is a cosmopolitan marine plankter, common in warm waters.

Rhizosolenia braunii HUST. forma.

Figs. 10 : 12-13, Lago Jurucui.

This taxon, which resembles a small *R. victoriae* SCHROED., was described by HUSTEDT in 1952. In some specimens I noticed the occurrence of a kind of hump just below the calyptra.

Surirella arcta A. SMITH ?

Figs. 6 : 2, 7 : 6, length 390 µ, Lago Jurucui.

Because only one specimen was observed, the identification is not convincing.

Scenedesmus ecornis f. **granulatus** THOM. n. f.

Fig. 16 : 16, Lago Jurucui.

Differs from typical *S. ecornis* (RALFS) CHOD. in having faint nodular thickenings at the poles of the cells.

Scenedesmus quadricauda v. **quadrispina** (CHOD.) G. M. SMITH forma.

Fig. 11 : 23, Lago Jurucui.

An interesting plant characterized by inclined spines. Cf. *S. quadricauda* v. *westii* G. M. SMITH in SMITH (1916, figs. 172-174), and *S. westii* (G. M. SMITH) CHOD. in CHODAT (1926, fig. 132).

Penium spirostriolatum f. **elongatum** THOM. n. f.

Figs. 6 : 1, 7 : 1, 8 : 5, 17 : 13, length 456-465 µ, breadth 24 µ, Lago Jurucui.

Cellulae perlongae 19-plo longiores quam latae, cylindricae; poli truncati. Membrana crassa, conspicue striata.

This forma is characterized by its considerable length, the apex is truncate instead of being rounded, and the strongly marked striae in a pronouncedly inclined spiral, see fig. 6 : 1.

Closterium baillyanum f. **curvatum** Thom. n. f.

Figs. 6 : 3, 17 : 16, length 328 μ, breadth 36 μ, Lago Jurucui.

Cellula valde curvata.

The membrane is smooth or faintly punctate. There ar two taxa to be considered, viz. *C. didymotocum* Ralfs and *C. baillyanum* Bréb. In West and West (1904, p. 117) *C. baillyanum* has been considered as a synonym of *C. didymotocum*. In 1919 Grönblad demonstrated that these are two distinct taxa. The Amazon plants have no girdle-bands, and the wall is not striate, indicating that they are *C. baillyanum*. Regarding the girdle-bands see Scott, Grönblad and Croasdale (1965, p. 27). However, since the girdlebands are not always discernable, and there are also forms with a smooth wall, it is not always easy to distinguish between these two taxa, especially when there are only a few specimens in the sample. The shape of Amazon plants is rather stout, resembling e.g. *C. didymotocum* Ralfs in Kossinskaja (1960, fig. 27 : 5). However, the Amazon plants are rather curved. Because of their shape and stout appearance, I have designated them as a separate forma of *C. baillyanum*, viz. f. *curvatum*. Kossinskaja has twice (1951, p. 575 and 1960, p. 237) indicated that *C. baillyanum* should properly be named *baileyanum*, after Jacob Bailey. However, it was probably named in honour of Charles François Bailly by Brébisson, so that *baillyanum* seems correct.

Closterium costatum Corda.

Figs. 6 : 9, 8 : 7-9, 14 : 11, length 288-324-493 μ, breadth up to 80 μ, Lago Jurucui.

These plants are similar to those figured by Borge (1918, figs. 1 : 21-23), being only slightly more curved. The arrangement of these plants in Krieger (1935) is not quite convincing. The plants in Borge's figs. 21-22 have been placed with v. *subcostatum*, and the one in fig. 23 with *C. costatum* itself. However, the plant in Borge's fig. 24, which is very close to Krieger's figure of v. *subcostatum* (fig. 34 : 6), has not been mentioned at all. Considering the two last mentioned figures as characteristic of the stout v. *subcostatum* (Nordst.) Krieger, all plants figured in my paper are to be included within the variation range of *C. costatum* Corda. Note the formation of what are possibly to be regarded as parthenospores in figs. 8 : 9 and 14 : 11.

Closterium lunula (Müll.) Nitzsch.

Figs. 6 : 6 and 8, 7 : 3, length (228)-400-540 μ, breadth 68 μ, Lago Jurucui.

Closterium lunula (Müll.) Nitzsch. forma.

Fig. 6 : 7, length 393 μ, Lago Jurucui.

This plant is similar in shape to Grönblad's *C. libellula* v. *angusticeps*, see Grönblad (1945, p. 9, fig. 12), but it is considerably larger in size. I am rather hesitant about the taxonomic affinities of Grönblad's plant. However, the fusiform plant from Lago Jurucui is also reminiscent of *C. lunula* v. *massaratii* (Wildem.) Krieger, which is a much larger plant. Unfortunately the sparse material does not allow close analysis of the taxonomic position of the present form.

Closterium macilentum Bréb. forma.

Figs. 7 : 2, 14 : 12, length 446.4-572 μ, breadth 23.8 μ, Lago Jurucui.
Cell wall smooth, apices with a pore.

Closterium porrectum v. borgei (Borge) Förster.

Figs. 8 : 10-11, 17 : 14-15, length 296-347 μ, breadth 28 μ, Lago Jurucui.

A plant characterized by its small degree of curvature, cf. Scott, Grönblad and Croasdale (1965, p. 28). Similar plants have also been reported by Borge (1903, fig. 1 : 20), and Förster (1964, p. 340, fig. 1 : 15). Note that the number of the visible costae obviously depends on the size of the cells.

Closterium turgidum v. borgei (Borge) Defl. forma.

Figs. 6 : 4-5, 8 : 6, length 816-818 μ, Lago Jurucui.

An impressive large *Closterium*. The membrane is slightly striated, the brownish apices are rather truncate. There are some similar taxa, viz. *C. turgidum* v. *borgei* (Borge) Defl. which differs slightly from the present plant in the shape of the apices; and *C. didymotocum* v. *maximum* Grönbl. which is less curved; and *C. baillyanum* Bréb. which has a punctate membrane. Having compared the present plants, especially their apices, with the figure in Borge (1903, fig. 1 : 11) I am inclined to consider them as a forma of *C. turgidum* v. *borgei*.

Pleurotaenium coronatum v. fluctuatum W. West.

Figs. 4 : 5-6, 5 : 3, 7 : 13-15, 10 : 8, length (273)-363-382 μ, breadth 36 μ, Lago Jurucui and Lago Rio Preto da Eva.

These plants resemble to some extent forms of v. *robustum* figured in Scott, Grönblad and Croasdale (1965, figs. 36-37). They all are relatively short, but not broad enough to be true, v. *robustum* W. West. In spite of their small size, I am inclined to consider them as belonging to v. *fluctuatum* W. West which might better be designated as a forma of *P. coronatum*, if separated from it at all. The small plant in fig. 4 : 6 seems to be the closest in proportions to v. *robustum* W. West.

Pleurotaenium minutum v. latum Kaiser forma.

Fig. 7 : 4, length 395 μ, breadth 38 μ, Lago Jurucui.

This specimen, the only one observed, is considerably larger, and relatively broader, than the taxon described by Kaiser. It is suggestive of some forms of *P. trabecula* (Ehrenb.) Näg. but there is no trace of basal swelling.

Euastrum brasiliense v. convergens Krieger.

Figs. 1 : 6, 12 : 5-8, length 84-100 μ, breadth 41-44 μ, Lago Jurucui.

Amazon plants are a little smaller than those from Africa described by Fritsch and Rich (1924). The converging sides of the semicells are characteristic of the variety. The variety very probably comes within the variation range of *E. brasiliense*. The similar *E. obesum* v. *crassum* f. *nasutum* Scott and Grönblad (1957, *p.* 14, figs. 3 : 4-5) has pyramidate semicells.

Euastrum evolutum v. **monticulosum** (TAYLOR) KRIEGER forma.

Fig. 12 : 9, length 60 µ, breadth 44 µ, Lago Rio Preto da Eva.

This is a rare taxon, described by TAYLOR from Colombia, and not reported since. The Amazon plant is a little smaller than those from Colombia, and the general shape is broader. It may be considered as a separate forma. However, more material is needed, since I have seen only one specimen.

Euastrum obliqueporum BRANDHAM.

Fig. 11 : 2, length 56 µ, Lago Jurucui.

Compare FÖRSTER (1964, fig. 5 : 7). At a cursory glance this taxon might be taken for an *E. brasiliense* v. *minus* G. S. WEST, see e.g. fig. 61 in SCOTT, GRÖNBLAD and CROASDALE (1965). The shape and size are identical.

Euastrum ornans FÖRSTER.

Figs. 1 : 7, length 26-30 µ, breadth 28-31 µ, Lago Rio Preto da Eva.

This plant is about twice as large as the somewhat similar *C. dilatatum* described by JÄRNEFELT and GRÖNBLAD (1960).

Micrasterias alata f. **gracilior** GRÖNBL.

Figs. 14 : 6-8, 17 : 18, Lago Jurucui.

GRÖNBLAD (1945, p. 14) points out the occurrence of thickenings in the cell wall, which are difficult to observe. In the present example, there is one just below the apex, and another above the isthmus, see fig. 14 : 7. The intersections are shown in figs. 14 : 6 and 8.

Micrasterias arcuata BAIL.

Figs. 11 : 4, 12 : 2-3, length 60 µ, Lago Jurucui.

Micrasterias arcuata is a rather multiform taxon, a large number of forms and varieties have been reported from the Americas. There are also a few records for tropical Africa. The distinction between *M. arcuata* and its v. *gracilis* is not always easy, because of the many intermediate forms, like those figured here. I am inclined to consider v. *gracilis* as being only a forma and not a variety, unless one prefers to consider v. *gracilis* as coming within the variation range of *M. arcuata*. Compare also fig. 2 in NORDSTEDT (1877), forma 1 in FÖRSTER (1964, fig. 12 : 4), and morpha minor in FÖRSTER (1969, p. 39). In the study of desmids, one must always be on one's guard against the description of individual specimens as taxa of different categories. Cf. NORDSTEDT (1877, p. 22).

Micrasterias borgei f. **minor** THOM. n. f.

Fig. 14 : 5, length 184 µ, breadth 172 µ, Lago Maica.

Forma minor quam forma specifica.

This plant looks like a diminutive *M. fimbriata* v. *elephanta* WOLLE. However, it may not belong to *M. fimbriata* at all. In spite of its small size, I am inclined to consider it as a forma *minor* of *M. borgei* KRIEGER. Compare also KRIEGER (1939, fig. 128 : 2) and fig. 7 : 12 in the present paper. The membrane of the plant shown in fig. 14 : 5 is smooth and there are only a few small spines located here and there along the incisions.

Micrasterias borgei v. **quadriverrucosa** THOM. n. var.

Figs. 7 : 10-11, 12 : 4, length 310-320 μ, breadth 230-240 μ, Lago Jurucui.

Varietas magnitudine formaque speciei similis. Membrana cum processibus binis prominentibus, cum dentibus magnis, supra sinum intra basim lobuli lateralis instructis.

The slender polar lobe indicates that this plant is more related to *M. borgei* than to *M. apiculata*. The variety is characterized by the frontal ornamentation which is made up of four large verrucae bearing blunt spines at their periphery as shown in fig. 7 : 11. Compare KRIEGER and SCOTT (1957, fig. 2 : 3).

Micrasterias laticeps v. **ampliata** KRIEGER.

Fig. 17 : 17, length 168-189 μ, breadth 200 μ, Lago Maica, rare.

Micrasterias laticeps is a greatly diversified taxon. Many forms and varieties have been described, mostly from the Brasilian region. See the discussion in BORGE (1925, p. 25).

Micrasterias mahabuleshwarensis v. **ampullacea** (MASK.) NORDST.

Fig. 13 : 5, Lago Jurucui.

This plant is more slender then the typical v. *ampullacea*. It seems to be an intermediate between v. *ampullacea* and ssp. *europaea* (NORDST.) TEILING.

Micrasterias radiata v. **gracillima** G. M. SMITH.

Figs. 5 : 1, 14 : 2-3, Lago Jurucui and Lago Maica.

The plant in fig. 14 : 2, like the plants in SCOTT, GRÖNBLAD and CROASDALE (1965, figs. 81-82), definitely belongs to v. *gracillima* G. M. SMITH. Identification of the plant in fig. 14 : 3, and the plants figured in SCOTT, GRÖNBLAD and CROASDALE (1965, fig. 8), and in THOMASSON (1965, fig. 7 : 3 and 1966, figs. 3 : 14-15, 5 : 3-6), is less easy. However, from these and other similar published figures, I draw the conclusion that all these plants might be gathered under *M. radiata* v. *gracillima*. There is, of course, some variation in the number of lateral lobes, in the length of polar lobe, and in the shape of its appendages. But, on the whole, plants in this taxon are more slender than in the succeeding one.

Micrasterias radiata v. **groenbladii** CROASD.

Type *M. radiata* v. *brasiliensis* GRÖNBLAD 1945, fig. 83 (non 82).

Figs. 13 : 4, 14 : 4, Lago Jurucui, Lago Maica.

There is no doubt that these plants are identical with that figured by GRÖNBLAD (1945, fig. 83), and also with the plants designated *M. furcata* RALFS by NORDSTEDT (1870, fig. 2 : 13), and *M. radiata* HASS. in BORGE (1925, fig. 2 : 7). The question of what is the correct name is a much discussed problem, see THOMASSON (1960, p. 24), GRÖNBLAD (1962, p. 7), SCOTT,

GRÖNBLAD and CROASDALE (1965, p. 39), and THOMASSON (1966, p. 21). This is obviously rather a confusing situation. In my 1966 paper, I have indicated the relationship between the plant figured in GRÖNBLAD (1945, fig. 82) and *M. radians*, and according to GRÖNBLAD (1962) it should be called *M. radians* v. *brasiliensis* (GRÖNBL.) GRÖNBL. For the slender plant in GRÖNBLAD (1945, fig. 83) CROASDALE (SCOTT, GRÖNBLAD and CROASDALE, 1965) has porposed the name *M. radiata* v. *groenbladii* CROASD. I have no objections. However, the figure (fig. 80) accompanying her proposal shows a considerably slender plant than GRÖNBLAD's, and this slender plant is most likely related to the plants designated *M. radiata* v. *brasiliensis* f. *gracillima* THOM. in THOMASSON (1966). The matter is complicated still more by the occurrence in the same sample of the plants designated as *M. radiata* v. *gracillima* G. M. SMITH, see SCOTT, GRÖNBLAD and CROASDALE (1965, figs. 81-82) and the plants shown in figs. 14 : 2-3. This leads me to consider at present all these extremely slender plants as morphae of *M. radiata* v. *gracillima* G. M. SMITH. To avoid confusion, every valid determination within the *radiata-radiosa-group* should be followed by a drawing or reference to an absolutely identical figure.

Micrasterias rotata (GREV.) RALFS.

Figs. 6 : 12, 7 : 7-9, 12 : 20, length (296)-330-360 μ, breadth (296)-300-310 μ, Lago Jurucui.

The plant in fig. 6 : 12 closely resembles *M. rotata* v. *pseudoquadridentata* GRÖNBL., and the one in fig. 7 : 7 is like *M. quadridentata* KRIEGER.

Micrasterias truncata f. **gibbosa** THOM. n. f.

Figs. 12 : 1, 13 : 1-3, Lago Jurucui.

Facies semicellulae unam protrusionem supraisthmalem permagnum praebens.

Micrasterias truncata is one of the most frequently studied *Micrasterias* species. There has been too much attention to its outline, and this has resulted in the description of a large number of varieties and forms. The present population is characterized by a broad longitudinal ridge on each side of the isthmus. Its origin close to the isthmus is seen in figs. 12 : 1 and 13 : 2. Because of the boss the plant always lies obliquely.

Actinotaenium turgidum v. **ligatum** (W. and W.) TEILING.

Fig. 1 : 5, length 116 μ, breadth 60 μ, Lago Maica.

This plant is broader than the typical v. *ligatum;* in vertical view it is circular.

Cosmarium contractum KIRCHN.

Fig. 11 : 6, length 29 μ, Lago Jurucui.

There are many similar taxa grouped under *C. contractum,* and its v. *ellipsoideum* : the somewhat similar v. *rotundatum* BORGE is a little larger. Compare also *C. contractum* f. *jacobsenii* in THOMASSON (1966, fig. 11 : 4), which is much larger. In KRIEGER and GERLOFF (1962) the f. *jacobsenii* has been included *in C. contractum.*

Cosmarium denticulatum v. **rotundatum** f. **mediolaeve** FÖRSTER.

Figs. 9 : 1-2, length 128-132 µ, breadth 80 µ, Lago Jurucui and Lago Rio Preto da Eva.

These plants are identical with the taxon recently described by FÖRSTER (1969, p. 48, fig. 19 : 5). It might be transferred to *C. groenbladii*. All of the observed plants are of moderate size, the sinus is open, and there is a bare area in the face of the semicells. They all seem to be near to *C. denticulatum* v. *ovale* GRÖNBL. Further figures are to be found in DEFLANDRE (1928, fig. 154), BORGE (1899, fig. 1 : 20) and BORGE (1925, fig. 3 : 25). Note, however, that the sinus of the plants in figs. 9 : 1-2 is open, and is therefore the same shape as in *C. groenbladii*. The sinus of all other plants referred to above is closed. In this context I must mention that I am rather hesitant about the interpretation of *C. denticulatum* in IRENÉE-MARIE (1940).

Cosmarium groenbladii (GRÖNBL.) THOM. n. comb.

Basionym : *C. denticulatum* v. *rotundatum* f. *gigantea* GRÖNBLAD (1945, p. 17, fig. 105).

Figs. 10 : 1-3, length 224-230 (240-243) µ, breadth 102 (132) µ, Lago Jurucui.

As has been pointed out by GRÖNBLAD (1945, p. 17) the taxonomic arrangement of *C. denticulatum* BORGE and its varieties and forms is a rather intricate problem. I propose to separate from that group plants which were described by GRÖNBLAD under the name of *C. denticulatum* v. *rotundatum* f. *gigantea*, and to consider them as a separate species. They are very large plants, length 224-243 µ. The semicells are abovoid, and the sinus is widely open. Spines are long, stout and curved. I have observed an injured semicell, see fig. 10 : 10, which could be designated as f. *rotundatum*. It is of about the same length (254 µ) but broader (150 µ) than *C. groenbladii*. The occurrence of spines in the face of the semicells is noteworthy. The small plant, length 171 (180) µ, figured in SCOTT, GRÖNBLAD and CROASDALE (1965, fig. 133) could be transferred to *C. groenbladii* as f. *minor*. It has a widely open sinus, obovoid semicells, and curved spines.

Cosmarium ornatum v. **pseudolagoense** FÖRSTER.

Figs. 11 : 8-11, length 40 µ, Lago Jurucui.

As has been pointed out by BOURRELLY (1961), there is a strong resemblance to some forms of *C. commissurale* BRÉB. Compare also *C. ornatum* f. *maior* BØRGES. (1890, fig. 4 : 29) : The present plant seems to represent an intermediate type between *C. ornatum* and *C. commissurale*.

Cosmarium pseudopachydermum NORDST. forma GRÖNBLAD, 1945.

Figs. 9 : 4-7, length 105-126 µ, breadth 66-71 µ, Lago Jurucui.

I have identified these plants as *C. pseudopachydermum* NORDST. The figure reproduced in NORDSTEDT (1888, fig. 5 : 20) gives no indication of the structure of the cell wall. A somewhat aberrant figure is to be found in GRÖNBLAD (1945, fig. 135). Note the incrassation in the face of the semicells. Compare also *C. incrassatum* (FRITSCH and RICH) KRIEGER and GERLOFF, and its v. *brasiliense* FÖRSTER.

Cosmarium sp.

Figs. 9 : 13-14, length 25 µ, breadth 26 µ, Lago Rio Preto da Eva.

This conspicuously ornamented plant is probably a new species. However, having

seen only one specimen, and not being quite sure whether it is a new species, I prefer for the present to leave the matter open.

Xanthidium canadense v. **amazonense** FÖRSTER.

Figs. 13 : 7-8, 14 : 10, length 68 (136-153) µ, breadth 140 µ, Lago Jurucui.

BORGE (1925) was hesitant about the relationship between his population and *X. antilopaeum* v. *canadense* JOSH. I have considered all plants equiped with long and stout spines as belonging to *X. canadense* v. *amazonense* FÖRSTER (1969).

Xanthidium fragile BORGE.

Figs. 2 : 5, 6 : 10, 15 : 1-6, length 60 (100-108) µ, Lago Jurucui.

There is no doubt that *X. fragile* is a taxon with a large number of forms. The present ones resemble the plant depicted by GRÖNBLAD (1945, fig. 155).

Xanthidium mamillosum (GRÖNBL.) FÖRSTER.

Figs. 2 : 1-3, 4 : 4, 16 : 13, length 64-78 (112-124) µ, breadth 112-127 µ, Lago Maica and Lago Rio Preto da Eva.

The spines of this taxon described by GRÖNBLAD (1945) have a characteristic swollen mamillate base. In some plants there are 1-2 frontal spines. The formae described by GRÖNBLAD (1945) are to be considered as belonging within the variation range of the species, except f. *longispina* which has a rather aberrant shape. The plant in fig. 2 : 3 is identical with GRÖNBLAD's *mediolaeve*, with the plant figured in DEFLANDRE (1928, fig. 155), and with *X. canadense* v. *borgei* FÖRSTER. In some specimens, see fig. 2 : 2, there are as many as 6 pairs of long spines around the margins of the semicells. These plants with supernumerary spines could be designated as f. *multispinum*. *X. mamillosum* somewhat resembles *X. amazonense* SCOTT and CROASDALE, which has, however, ovate semicells, and a shallow and open sinus.

Xanthidium nordstedtii (GRÖNBL.) GRÖNBL. and SCOTT.

Figs. 16 : 11-12, Lago Jurucui and Lago Maica.

Related to this taxon is *X. antilopaeum* v. *ayayense* GRÖNBL., which might be transferred to *X. nordstedtii*. The spines of *X. nordstedtii* rise from a base, which is absent in the similar *X. antilopaeum* v. *ayayense*. Compare also *X. antilopaeum* f. *minor* NORDSTEDT (1877, fig. 6).

Xanthidium paraguayense BORGE.

Figs. 11 : 5, 12 : 12 -13, length 58 µ, breadth 60 µ, Lago Maica.

In considering relations between this taxon and *Cosmarium paraguayense* BORGE and some other related taxa, (see TAYLOR, 1939, p. 118), one can not deny its strong affinities to *Cosmarium*. The structure of the membrane is evident from fig. 11 : 5 in the present paper.

Xanthidium pseudoregulare v. **hexagonum** THOM. n. var.

Figs. 2 : 4, 6 : 10, 15 : 7-14, length about 120 µ, Lago Jurucui, Lago Rio Preto da Eva.

Xanthidium pseudoregulare as described by BORGE (1903, p. 103, fig. 4 : 1) has solid processes that are bifurcate. Another plant figured by GRÖNBLAD (1945, fig. 160) also has

solid processes but they have three stout spines. Both these plants are oblong-elliptic in vertical view. The plants figured here have thick hollow processes. There are 6 processes in lower series, and 4 in the apical one. The processes in the lower series have 3-4 stout spines : in the apical series the processes have 2-3 stout spines. In vertical view the semicells are almost hexagonal. But note that one can still distinguish between the front and the sides of the semicells, in some cases only because of the position of the apical processes. Cf. *X. sexangulare* v. *robustius* (GRÖNBL.) FÖRSTER (1969).

Staurodesmus clepsydra v. **obtusus** (NORDST.) TEILING.

Fig. 1 : 9, Lago Maica.

This plant is identical with the one designated as *Staurastrum pachyrynchum* NORDST. in BORGE (1903, p. 106, fig. 3 : 39). In 1918 BORGE (p. 47) transferred it to *Staurastrum clepsydra* v. *obtusum* NORDST.

Staurodesmus megacanthus v. **triangularis** (GRÖNBL.) TEILING forma.

Figs. 1 : 12, 16 : 10, length 65 μ, breadth 60 (80) μ, Lago Maica.

A large plant resembling a little *Staurastrum wildemanii* v. *unispiniferum* SCOTT and PRESCOTT in FÖRSTER (1964, fig. 33 : 17), which is most likely a separate taxon. The shape of the Amazon plants also resembles *Staurodesmus megacanthus* v. *triangularis* and I have considered them as a forma of this, differing in having longer spines, cf. GRÖNBLAD (1945, fig. 230). There is also some resemblance to *Staurodesmus mucronatus* v. *subtriangularis* (W. and W.) CROASD. and *S. dickiei* v. *rhomboideus* (W. and W.) LILLIER., but both are generally smaller than the plants from the Amazon basin. Compare also *S. tripyrenoideum* SCOTT and PRESCOTT (1961, p. 114, fig. 49 : 6) and *S. megacanthum* LUND. forma in KRIEGER (1932, fig. 15 : 1).

Staurodesmus spencerianus (MASK.) TEILING.

Figs. 1 : 10-11, 16 : 9, length 32.5-34 (48.5-54) μ, breadth 65-68 μ, Lago Maica.

These plants resemble those figured by FÖRSTER (1964, fig. 33 : 1-2) under the name of *Staurastrum selenaeum* GRÖNBL., but are not identical. The plants figured in this paper are a little larger than those figured by FÖRSTER. They resemble some forms of *Staurodesmus cuspidatus* v. *curvatus* (W. WEST) TEILING, and there are also *S. aristiferus* (RALFS) THOM., and different forms of *S. spencerianus* (MASK.) TEILING to be considered. The apex of the plants from the Amazon basin is concave, and the spines are short. I have consulted Dr. TEILING, and he has suggested *S. spencerianus*. Compare the figures in TEILING (1967, pl. 27). See also THOMASSON (1966, figs. 14 : 5-7), plants which have been transferred by TEILING (1967, p. 85) to *S. unguiferus* v. *pseudoamericanus* (GRÖNBL.) TEILING, *S. cuspidatus* v. *groenbladii* FÖRSTER, and *S. megacanthus* v. *scoticus* (W. and W.) LILLIER. in FÖRSTER (1969).

Staurodesmus subulatus f. **nordstedtii** (G. M. SMITH) THOM.

Fig. 16 : 5, Lago Jurucui.

This plant is identical with the plants figured in GRÖNBLAD (1945, figs. 186-187) as *S. triangularis* v. *inflatus* W. and W. TEILING (1967) has transferred this variety to *S. subtriangularis*, also referring to GRÖNBLAD's figures. With reference to the figure of *S. subulatus* f. *nordstedtii* in TEILING (1967, fig. 19 : 5) I have identified the Amazon plants as that taxon. Note that the matter has also been discussed in SCOTT, GRÖNBLAD and CROASDALE (1965, p. 49)

with reference to similar plants, there called *Arthrodesmus rhomboideus* v. *longispinus* CROASD., and altered to *S. subulatus* v. *rhomboideus* (HIRANO) TEILING in TEILING (1967). There is no doubt that all these plants appearing under different names belong to the same taxon. Cf. *S. subulatus* v. *rhomboides* f. *longispinus* (CROASD.) FÖRSTER.

Staurodesmus validus (W. and W.) THOM.

Figs. 16 : 1-4, length 30-34 (52-58) μ, breadth 28-34 (76-82) μ, Lago Jurucui.

These plants have two pyrenoids. There is a variety of *S. validus*, viz. v. *subvalidus*, which is characterized by the occurrence of two pyrenoids. However, I agree with TEILING (1967) about the importance of the number of pyrenoids. In spite of the strong affinities between the plant in fig 16 : 1 and *S. subulatus* (KÜTZ.) THOM. and its *v. nordstedtii*, I am inclined to consider that it also belongs to *S. validus*. Note that the apex is more rounded, and the spines less divergent than in the typical *S. validus*. Compare also figs. 16 : 2-4 which show rather typical plants of *S. validus*, perhaps a little too broad.

Staurastrum boergesenii RACIB.

There is considerable variation in the length and number (5-6) of processes, and the length and number of their terminal spines. There is also variation in the apical and supra-isthmal ornamentation. Hence a number of varieties have been added by various authors. However, having studied the present rich population, and compared it with already published figures, I became rather doubtful whether it is practicable to keep all these separate varieties. In many cases they seem to represent single individuals alone. In such cases the authors have probably had only a few specimens available. At present, I am inclined to consider v. *elegans* BORGE (1925, fig. 5 : 12) as being a good variety, characterized by the supraisthmal bifurcate verrucae. In the present population, figs. 1 : 14-15 and 19 : 15 resemble v. *depauperatum* GRÖNBL. There are both 5 and 6 radiate plants which show different stages of reduction of ornamentation. Some of them are not unlike *S. nudibrachiatum* BORGE (1903, fig. 4 : 20) which has also been described from Brazil. However, the similarity is superficial. Other plants, e.g. those in figs. 1 : 17, 19 : 12-13, and 13 : 10 are more like *S. boergesenii* itself, see the fig. 5 : 53 in BØRGESEN (1890), or its v. *simplicior* RACIBORSKI (1892, fig. 7 : 7). Other figures to be compared are GRÖNBLAD (1945, figs. 192-195), FÖRSTER (1964, fig. 30 : 8), and in SCOTT, GRÖNBLAD and CROASDALE (1965, figs. 223, 225-227).

Staurastrum brachioprominens f. minor THOM. n. f.

Fig. 18 : 4, length 18-20 (32-36) μ, breadth 72 μ, Lago Maica.

Cellulae minores quam in specie.

In spite of the smaller size I have identified this plant as *S. brachioprominens* BØRGESEN (1890, p. 47, fig. 5 : 52), and it might be considered as f. *minor*. The processes are relatively longer than those of BØRGESEN's plant, and the margins of the processes are pronouncedly crenulate. In 1956, I discussed *S. brachioprominens* and some of the related taxa. Hense it is evident that there are many stumbling-blocks in the interpretation of the taxa grouped around *S. brachioprominens*. It is interesting to note that the major part of the varieties and forms which have been identified as *S. brachioprominens* are all stouter than BØRGESEN's plant. The present plant, with its slender undulating processes, is much more graceful in appearance than all these stout forms. However, the shape and ornamentation of the semicells are similar to *C. brachioprominens*. Compare also *S. caledonense* HUBER-PESTALOZZI.

Staurastrum cingulum (W. and W.) G. M. SMITH.

Fig. 18 : 21, length 28 (60) μ, breadth 84 μ, Lago Maica.

This is just the kind of plant which formely would have been called *paradoxum*, or perhaps *gracile*. Now, however, it is necessary to define a more convincing taxonomic position. It resembles *S. americanum* (W. and W.) G. M. SMITH in GRÖNBLAD (1945, fig. 188), a rather expressionless figure, and also *S. noduliferum* GRÖNBL. According to the analyses of the *cingulum-group* by BROOK (1959, pp. 559-600) the present plant should be placed with *S. cingulum* (W. and W.) G. M. SMITH. Compare fig. 12 : 5 in BROOK (1959), a plant with somewhat shorter processes. There are, of course, some similar forms of *S. pingue* TEILING, but they have longer and subcylindrical semicells, and different ornamentation. Compare also the larger *S. cingulum* (W. and W.) G. M. SMITH in SKUJA (1948, p. 170, fig. 18 : 10), there called *S. gracile* RALFS.

Staurastrum glabribrachiatum FÖRSTER.

Figs. 3 : 5, 17 : 3, length 34 μ, breadth 60 μ, Lago Maica.

This plant is of about the same shape and size as *S. subpolymorphum* described by BORGE (1903, p. 107, fig. 4 : 13). Both are six-radiate and the processes are smooth. However, the present plant has processes about twice as long as those of BORGE's plant.

Staurastrum jurucuiense THOM. n. sp.

Figs 5 : 7-8, 10 : 11, 17 : 15, length 16 (61) μ, breadth 70-73 μ, Lago Jurucui, Lago Maica, common.

Staurastum parvum, biradiatum, sinu late aperto, anguli laterales in processus perlongus tenues sursum divergentes extensis, processibus ad extremitates bifurcatis, levissimos margines habentibus. Semicellulae spinam parvum ad angulos basales utriusque semicellulae habens; apex elevatus.

This delicate *Staurastrum* is characterized by its long and slender processes, which have subparallel margins. The only ornamentation of the margins is a few prominent spines. The processes terminate in two spines. The apex of the semicells is elevated, bearing four small spines. There is a prominent spine on both sides of the sinus. This plant somewhat resembles *S. lepidum* v. *latecurvatum* GRÖNBL.

Staurastrum leptocladum v. **africanum** G. S. WEST. forma.

Figs. 3 : 4, 18 : 1, length 62 μ, breadth 170 μ, Lago Maica.

The first figure shows a plant which bears a strong resemblance to the taxon described by G. S. WEST (1907, fig. 12). The second is more like the plant depicted by GRÖNBLAD (1945, fig. 218).

Staurastrum nodulosum PRESCOTT forma.

Fig. 18 : 17, length 25 (62) μ, breadth 64 μ, Lago Maica.

Note that the basal part of the semicells is cylindrical, and not cup-like. This plant is very like *S. caledonense* f. *maior* THOM. in THOMASSON (1965, p. 24, fig. 11 : 8).

Staurastrum octodontum v. longibrachiatum Thom. n. var.

Figs. 3 : 13, 6 : 11, length 11.2-13.5(94.5-104.5) µ, breadth 73-85 µ, Lago Jurucui, Lago Rio Preto da Eva, rare.

Forma nova a typo differt processibus longioribus et tenuioribus.

This variety is characterized by its long and slender processes. The shape of the cell body resembles *S. octodontum* Skuja forma in Scott and Prescott (1958, fig. 15 : 2). The processes, however, are considerably longer. Compare also *S. octodontum* v. *tetrodontum* Scott and Grönblad (1957, p. 43, fig. 27 : 14). *S. lepidum* v. *latecurvatum* Grönbl. is larger and has four apical spines. Compare also *S. subparvulum* West and West (1902, fig. 22 : 7).

Staurastrum oxyacantha v. maius Scott and Grönblad forma.

Fig. 17 : 1, length 42-44 µ, breadth 76-78 µ, Lago Jurucui.

The Amazon plant differs from the variety described by Scott and Grönblad (1957, p. 43, figs. 32 : 3-6) in having considerably longer processes. Other similar taxa are : *S. cyclacanthum* v. *subacanthum* Grönblad (1962, p. 10, fig. 3) which is less spiny, and *S. subcontroversum* Krieger and Bourrelly (1956, p. 166, figs. 12 : 128-130) which is also less spiny and which is a smaller plant. The similar *S. cyclacanthum* W. and W. forma in Grönblad, Scott and Croasdale (1964, p. 30, figs. 197-198), which is unlike to belong to *S. cyclacanthum* W. and W., is also smaller. The shape of the Amazon plant is also very like that of *S. gracile* v. *curtum* Nordst. The drawing of this variety reproduced by Nordstedt (1870, p. 191, fig. 4 : 53) has rather a rough outline. It seems to be a plant from the *anatinum*-group. Within the *anatinum*-group there are some plants grouped with *S. anatinum* f. *hirsutum* Brook which resemble the Amazon plant but the apical ornamentation is different. Cf. also *S. elegantissimum* v. *brasiliense* f. *triradiatum* Förster (1969, fig. 46 : 4-7).

Staurastrum pseudoquadrangulare Thom. n. sp.

Figs. 3 : 8-10, length 30 (46) µ, Lago Rio Preto da Eva.

Angulis superioribus in processus breves bifidos productis, angulis inferioribus aculeis binis instructis.

This plant is very like *S. quadrangulare* Bréb. However, the processes and spines on the angles of semicells are located in the inverse order, viz. there are short processes with two fairly long spines at the superior angles, and two long spines at the inferior angles.

Staurastrum quadrinotatum Grönbl. forma.

Fig. 3 : 11, length 21.5(84) µ, breadth 102.5 µ, Lago Rio Preto da Eva.

Like the taxon described by Grönblad (1945, fig. 258), this plant has four apical spines. The semicells are a little more cup-shaped than those of Grönblad's plants. However, there is some variation in shape of semicells, compare Scott, Grönblad and Croasdale (1965, figs. 213-215). Their plant in fig. 213 is very like *S. subamericanum*, described by Grönblad.

Staurastrum rectangulare Borge forma.

Fig. 17 : 12, length 48 µ, breadth 32 µ, Lago Jurucui.

This plant is similar to the one described by Grönblad (1945, p. 32, fig. 301) as f. *elongata* of *S. zonatum* Børg. Note that there is also a reference to *S. rectangulare* Borge.

However, in the description of *S. rectangulare* by BORGE there is a reference to *S. zonatum* BØRG, so this is obviously an intricate relationship, see also THOMASSON (1966, p. 35). Having studied a great many figures of *S. zonatum*, and its varieties and forms, and the few published figures of *S. rectangulare* and its varieties. I am inclined to consider this Amazon plant as a specimen of *S. rectangulare* BORGE. The f. *elongata* GRÖNBL. of *S. zonatum* BØRG. probably also belongs to *S. rectangulare*. Cf. MÖBIUS (1895, fig. 14).

Staurastrum sebaldi v. **ornatum** NORDST.

Fig. 3 : 7, length 60 μ, breadth 86 μ, Lago Maica.

Similar plants have sometimes been grouped with *S. manfeldtii* but the taxon described by DELPONTE has relatively cylindrical semicells and a narrow sinus.

Staurastrum siolii f. divergens THOM. n. f.

Figs. 3 : 15, 19 : 20, length 44 (72) μ, breadth 80 μ, Lago Maica.

Forma quasi eadem magnitude ac species; differens processibus divergentibus, non convergentibus.

Staurastrum siolii SCOTT and CROASDALE has converging processes : the present forma is characterized by diverging ones. Otherwise, the size, shape, and ornamentation are very similar. Compare also *S. tangoroaii* in THOMASSON (1960*a*, p. 239), *S. pseudoplanctonicum* v. *planctonicum* TEILING, and *S. johnsonii* v. *amazonense* FÖRSTER both in FÖRSTER (1969).

Staurastrum spiculiferum f. minor THOM. n. f.

Fig. 17 : 9, length 22(28) μ, breadth 40 μ, Lago Maica.

Cellulae parva, multo minores quam in specie.

This forma is characterized by its small size. It is a triradiate plant.

Staurastrum stelliferum v. **evolutum** THOM. n. nom.

Basionym : *S. leptopus* v. *corpulentum* THOM. in SCOTT, GRÖNBLAD and CROASDALE (1965, p. 55, fig. 194), non THOMASSON (1960*b*).

Figs. 17 : 6, 18 : 13-15, length 25.2-32(70-78) μ, breadth 72-100 μ, Lago Jurucui.

There is no doubt that the plant in fig. 17 : 6 is identical to the plant figured in SCOTT, GRÖNBLAD and CROASDALE (1965, fig. 194) under the name of *S. leptopus* f. *corpulentum* THOM. However, the identification may not be correct. After study of the present population, which includes plants like those in figs. 18 : 13-14, the relationship to *S. stelliferum* BORGE seems to be most plausible (compare fig. 18 : 16 in the present paper). The ornamentation in *S. stelliferum* is much reduced, unlike that of the plants discussed above. The ornamentation in these plants is of the same type as in *S. longimum* v. *spiniferum* SCOTT and GRÖNBLAD (1957, fig. 20 : 3), but the processes are smooth. Note also that CROASDALE (in SCOTT, GRÖNBLAD and CROASDALE, 1965, p. 55) has emphasized the affinity between *S. leptopus* KRIEGER and *S. stelliferum* BORGE, likewise also FÖRSTER (1969, p. 95).

Staurastrum subanchora GRÖNBL. forma.

Figs. 3 : 6, 8 : 1-3, 17 : 2, length 60 μ, breadth 97-104 μ, Lago Maica.

Because of the indistinct drawings, the ornamentation in this taxon described by GRÖNBLAD (1945, figs. 278-279) is rather difficult to discern. However, it is anyway not as

heavy as in the present plants, which have verrucae while GRÖNBLAD has indicated only granules. Nevertheless, I have identified my plants as the same as those described by GRÖNBLAD. The size and shape fit well, and the relation between granules and verrucae is just a question of different stages of development of ornamentation. I have also observed Janus-forms 2+3, see fig. 17 : 2. In these plants the biradiate semicell resembles *S. anchora* W. and W. figured in SMITH (1924, fig. 77 : 8). There are some other taxa which resemble the Amazon plants, e.g. that figured as *S. johnsonii* v. *altius* FRITSCH and RICH in GRÖNBLAD (1962, p. 11, fig. 29). It is almost identical to the plants discussed above. The choice between the plants drawn by GRÖNBLAD in 1945 and 1962 seems to be a matter of opinion. However, having studied some African populations of the taxon described by FRITSCH and RICH, I think that the Amazon plants are better put with *S. subanchora* than with *S. johnsonii* v. *altius*. *S. subanchora* belongs to the *S. planctonicum*-group.

Staurastrum submanfeldtii v. **convergens** GRÖNBL. forma.

Figs. 18 : 9-10, length 40 μ, breadth 80 μ, Lago Maica.

This plant resembles *S. submanfeldtii* v. *convergens* described by GRÖNBLAD, (1945, fig. 286) which seems to be more closely related to *S. approximatum* than to *S. submanfeldtii*. Both were described by WEST and WEST (1902, pl. 22). However, *S. submanfeldtii* v. *convergens* has rather prominent ornamentation on the basal portion of the semicells. In the plants from Lago Maica there are only a number of small granules. There are some more plants to be compared, e.g. *S. gracile* forma in KRIEGER (1932) which is only of about half the size of the Amazon plant. *S. sebaldi* v. *ornatum* in FÖRSTER (1964, figs. 31 : 9-11) is another similar plant, and so is *Staurastrum* sp. in THOMASSON (1960*b*, fig. 9 : 21), which is of about the same shape and size as the plants figured here. These plants also resemble the plant which has been designated as *S. cerastes* v. *coronatum* f. *inflatum* SCOTT and PRESCOTT by HIRANO (1967, p. 64, figs. 14 : 1-2). Because there is ornamentation, although reduced, on the base of the semicells, I have preliminarily placed these plants with the variety described by GRÖNBLAD. More material is needed for the analysis of the taxonomic relations.

Staurastrum tectum v. **ayayense** GRÖNBL.

Figs. 3 : 12, 17 : 7, length 28-30 (95-100) μ, breadth 140.5-156 μ, Lago Maica.

This forma is characterized by its long processes. Compare *S. tectum* BORGE in fig. 17 : 6. Some forms of *S. quadrinotatum* GRÖNBL. and *S. tectum* v. *ayayense* GRÖNBLAD (1945, p. 31, figs. 289-291), and FÖRSTER (1969, figs. 38 : 8-10) are also similar. Compare also *S. guentheri* in THOMASSON (1955, fig. 3 : 3, and 1956, fig. 12).

Staurastrum thienemannii KRIEGER forma.

Fig. 17 : 8, length 14 (36) μ, breadth 58 μ, Lago Rio Preto da Eva.

This small four-angular plant with smooth processes resembles *S. thienemannii* f. *triradiatum* SCOTT and PRESCOTT (1961, fig. 42 : 5). Other similar plants are *S. thienemannii* v. *calvum* SCOTT and PRESCOTT (1961, fig. 42 : 6) and *S. tryssos* SCOTT and GRÖNBLAD (1957, fig. 28 : 15), but both are larger and five-angular. Compare also *S. glaphyrum* W. and W. in SCOTT, GRÖNBLAD and CROASDALE (1965, p. 54, fig. 186).

Staurastrum triundulatum v. brasiliense GRÖNBL.

Fig. 17 : 8, length 32 µ, Lago Jurucui.

Compare GRÖNBLAD (1945, p. 32, fig. 296). This taxon differs from the very similar *S. subindentatum* v. *brasiliense* f. *sexspinulosum* FÖRSTER in its long processes. They might be considered as different forms of the same taxon. *S. subindentatum* v. *lepidiforme* CROASD. (in SCOTT, GRÖNBLAD and CROASDALE, 1965, p. 60, fig. 212) is also closely related to this group.

Staurastrum vestitum v. subanatinum W. and W.

Figs. 3 : 1-3, 19 : 17-19, length 40-48 µ, breadth 112-124 µ, Lago Maica.

See SCOTT, GRÖNBLAD and CROASDALE (1965, figs. 220-221). Compare also *S. vestitum* v. *denudatum* in NORDSTEDT (1870, fig. 4 : 40). Cf. FÖRSTER (1969, p. 98).

Staurastrum wolleanum v. brasiliense SCOTT and CROASD.

Fig. 18 : 20, length 42 (68) µ, breadth 32 (72) µ, Lago Maica.

There are seven processes in every whorl. It is of some interest to compare the present plant with *S. subunguiferum* v. *goyazense described by* FÖRSTER (1964, figs. 34 : 8-11) and transferred by TEILING (1967, p. 552) to *Staurodesmus*. I agree with him that it is doubtful, it may more likely be a reduced form of *Staurastrum wolleanum* v. *brasiliense* than a *Staurodesmus*.

Teilingia wallichii (JACOBS.) BOURRELLY.

Fig. 11 : 14, Lago Jurucui.

There is no doubt that *T. wallichii* resembles some forms of *T. granulata* (ROY and BISS.) BOURRELLY, see e.g. SCOTT and PRESCOTT (1961, fig. 60 : 5). This has already been pointed out by GRÖNBLAD (1945, p. 32). I have not observed the v. *borgei* described by GRÖNBLAD, which is characterized by its apex being retuse in the central part. This variety has been recorded from Brasil by BORGE (1925), SCOTT, GRÖNBLAD and CROASDALE (1965), FÖRSTER (1969).

Desmidium pseudostreptonema W. and W.

Fig. 12 : 5, Lago Jurucui.

This taxon should be carefully compared with *D. bengalicum* TURNER, see especially fig. 19 : 3 in TURNER (1892).

Brachionus mirabilis DADAY.

Figs. 20 : 1-3, Lago Jurucui.

In the sample from Lago Jurucui there are two distinct types of *B. mirabilis*, one with bowed and converging postero-dorsal spines (figs. 20 : 2-3).

Dipeuchlanis sp. ?

Figs. 23 : 2-3, length 160 µ, breadth 96 µ, toes 56 µ, Lago Jurucui.

Body dorso-ventrally compressed, lorica of two plates, with no posterior notch. The toes are long and slender.

Lecane armata THOM. n. sp.

Figs. 24 : 6-7, length 96 µ, breadth 92 µ, toes 40 µ, Lago Jurucui.

This species is characterized by its spiny lorica, the pattern of surface markings is shown by the figures. It is unique within the genus. Cf. *L. gilardi* BERZINŠ.

Lecane cornuta (O. F. MÜLLER).

Fig. 21 : 8, length 122 µ, breadth 112 µ, Lago Maica.

The size of the animal in this sample is between that of the type form and its v. *oidipus* HAUER. See the discussion of the taxonomic relation in HAUER (1956, pp. 299-300).

Lecane curvicornis (MURRAY).

Fig. 21 : 6, length 132 µ, width 100 µ, toes 64 µ, Lago Maica.

This is not a very typical specimen, and it has some features of f. *nitida* (MURRAY), compare fig. 22 : 1. Another interesting specimen from Lago Maica is the one in fig. 20 : 11, length 132 µ, width 116 µ, toes 80 µ. It is identical with the animal figured in HAUER (1965, fig. 15). The shape of the claw is notable. The third specimen figured here in fig. 4 : 9, also from Lago Maica, is large-sized, length 202.5 µ, width 148.5 µ, toes 135 µ. Its relation to *L. curvicornis* is doubtful.

Lecane curvicornis nitida (MURRAY).

Fig. 22 : 1, length 150 µ, width 108 µ, toes 68 µ, Lago Jurucui.

Lecane lauterborni HAUER ?

Fig. 21 : 7, length 108 µ, width 80 µ, toes 42 µ, Lago Jurucui.

The identification has been made with some hesitation. Compare also *L. mucicola* (BRYCE), and also *L. intrasinuata* (OLOFSSON), the latter figured, for example, in HAUER (1935, fig. 16).

Lecane leontina TURNER.

Figs. 4 : 8, 23 : 5, length 227 µ, width 167.5 µ, toes 154 µ, Lago Maica.

The shape of the lorica, its tail-like projection with two long spines, and extremely long, slender toes are characteristic of *L. leontina*. However, I have not been able to observe the basal spicule of the claw. Nevertheless, I am inclined to identify this specimen as *L. leontina*. Earlier records of *L. leontina* from South America are from Brazil, Paraguai, Venezuela, and Colombia.

Lecane melini THOM.

Figs. 20 : 9-10, 22 : 5, length 160 µ, width 108 µ, toes 60-64 µ, Lago Jurucui and Lago Maica.

This taxon was first described in 1954 and has turned out to be a widely distributed rotifer in the Amazon basin. It has also been reported from Venezuela by HAUER (1956).

Lecane methoria HARRING and MYERS.

Fig. 21 : 9, length 68 µ, width 52 µ, toes 24 µ, Lago Maica.

This little rotifer is most likely *L. methoria*, see HARRING and MYERS (1926, p. 343, figs. 19 : 1-2), TARNOGRADSKY (1916, p. 44, figs. 26-27). However, BARTOŠ (1959, p. 478) united it with *L. stichaea* HARRING, as was already done by CARLIN. They are certainly similar, but *L. stichaea* is a considerably larger species.

Lecane pertica HARRING and MYERS.

Figs. 21 : 3-4, length 108-124 µ, toes 45-56 µ, Lago Jurucui.

This is probably identical with the *Lecane* sp. figured by GILLARD (1967, fig. 12) from Lago Jurucui.

Lecane remanei HAUER.

Figs. 22 : 2, 23 : 1, length 126.4-128 µ, width 107.2-112 µ, toes 48 µ, Lago Jurucui.

This animal was recently (1964) described by HAUER. It seems to be widely distributed in the Amazon basin.

Lecane saginata HARRING and MYERS ?

Figs. 21 : 5, length 112 µ, width 84 µ, toes 46 µ, Lago Jurucui.

Another troublesome identification. Compare the rather similar *L. aquila* HARRING and MYERS in HAUER (1958, fig. 3), and also *L. intrasinuata* (OLOFSSON) in HAUER (1935, fig. 16), and *L. levistyla* OLOFSSON (syn. *L. scobis* HARRING and MYERS).

Ptygura sp.

Fig. 24 : 11. Lago Maica.

Impossible to identify in preserved samples.

Testudinella ahlstromi HAUER.

Figs. 4 : 10, 24 : 1, length 128-129 µ, width 96 µ, Lago Jurucui, Lago Maica.

All four previously published figures show the ventral side, the present specimen is shown from the dorsal side. The anterior dorsal margin is tripartite. It is a little more protruding than in the earlier figured specimens.

Testudinella amphora HAUER.

Fig. 24 : 3, Lago Maica.

The identification of many *Testudinella* specimens is rather difficult, because of the occurrence of animals which are not fully-grown, and some variation in shape due to the preservative. This specimen resembles *T. amphora*, with the anterior part not yet fully developed, compare HAUER (1938, fig. 80).

Testudinella semiparva HAUER.

Fig. 24 : 4, Lago Jurucui.

The shape of this animal resembles to a high degree the specimen figured in AHLSTROM (1938, fig. 8 : 8) as *T. parva* (TERNETZ). However, as has been pointed out by HAUER (1938, p. 559), *T. parva* has a very characteristic foot opening which has a transverse elliptical

posterior part. Therefore the specimen from Lago Jurucui, as well as the one figured by AHLSTROM, should be considered to be *T. semiparva*, which has been described from Indonesia.

Testudinella tridentata amazonica THOM. n. ssp.

Fig. 22 : 9, Lago Jurucui.

This Amazon taxon has a characteristic long spine on both sides of the antero-median spine. It should be compared with *T. dicella* MYERS in AHLSTROM (1938, fig. 8 : 5), in which the median spine also has a distinct median line. Compare also *T. tridentata africana* BERZINŠ in GILLARD (1952, p. 345, figs. 6 and 7 *d*).

In preserved samples there are always many indeterminable animals. A few of them may be identified when living specimens have been studied. The one in fig. 22 : 7 from Lago Jurucui has a very characteristic house which is attached on *Desmidium* with a long foot. It might belong to the *Vagnicolidae*, but the less likely possibility that it is a rotifer cannot be excluded. In the sample from Lago Maica there was a curious ciliate, fig. 22 : 6. Length 146 μ, including the peculiar anterior appendage, breadth 72 μ. The colour is yellowish, its contents were four long diatom specimens.

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